

The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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New Wrought Iron Bridge Design.

We publish in this issue two cuts illustrating a new design elliptical truss for wrought iron bridge building. The first cut upon this page represents a double span bridge of this kind, combined with the Pratt truss. The designer, Capt. William O. Douglass, of Binghamton, N. Y., sends a very interesting letter concerning the designs, from which we compile the following:

The wrought iron bridge illustrated on page 5 is new in bridge architecture. The supporting members are simple trusses, upon which the strains from a given load may be exactly and easily calculated, and each member may be exactly proportioned to its strain, thereby giving the greatest result in capacity and the least amount in material.

The feature of this truss is the combined arch and suspension principles, forming, in connection with the web members, an elliptical truss in which the thrust of the arch equipoises, and is equipoised by the pull of the cable. The arch may be a true segment of a circle or a hipped arch, as shown, through which the force is exerted in straight lines from point to point of support.

The strain upon the arch from a given load is much less than its versine (half of the depth of the truss) would indicate without close examination, inasmuch as the thrust of the arch tends to raise the cable to its chord or to a straight line from foot to foot of the arch. Thus the cable is made largely to support the load by a force which would be practically lost were the arch to thrust against a straight line chord, as in the "bow string" form. The same economy is true of the effects of the forces acting through the cable upon the arch and in the same manner.

The verticals between the arch and cable are preferably cylindrical in form, affording easy adjustment and connection with the chord members, resting as they do in iron seats cast to the level of the chords. The panel diagonals are strained least in the second panel, and less, also, in the panels between the hips of the arch than in those intermediate between them and the second panel. The end posts have no strain greater than the dead load of the bridge and its moving load, and they may be omitted altogether when the water-way will admit. The floor is suspended from the trusses, the suspension bars being of round iron, passing through the chords or arch and cable, and also through the sheets or verticals. A slight chord is placed along the floor line, forming part of the usual sway brace system under the floor. The floor suspenders are strained by one panel load, and are connected with this chord and the iron floor girders. The cable is made of flat bars of iron. The arch is made of channel bars or I beams, or when the span is long angle iron and plates are riveted together, forming a box arch of sufficient ratio of diameter to length for this compressive member. This bridge is cheap and durable, exceedingly rigid and possesses great strength.

Referring to the double span illustration upon this page, we have the elliptical truss, before described, combined with the Pratt system. The strains upon the chords of the elliptical truss increase from center to end, while the strains upon the chords of the Pratt truss increase in the same ratio from end to center. Therefore, the aggregate chord strains in each panel throughout the truss are equal. The same conditions exist throughout the truss relative to the diagonals and verticals.

In considering this structure it is important to keep in view the fact that the verticals rest on and are placed between the chords, and are held in place by a rod passing through the chords and verticals, and to which the floor girders are attached. Also that the diagonals between the elliptical chords are not "counters," as might seem to appear, but are the main suspension bars of that truss. The elliptical chords serve all purposes of "counters." The usual and very proper objection to compound trusses is that their form defies the engineer in his efforts to resolve the forces or calculate its strains. This objection scarcely exists in this case, as the strains on each truss from the same load are entirely independent of one another in their action. Careful experiment has shown that it is easily susceptible of such adjustment that the weight may be caused equally by each or wholly by one of the simple trusses.

The strength of this structure is not wholly dependent upon the strength of any one individual member, as is the case in all of the

popular forms now in general use. This fact may serve to preclude the possibility of the occurrence of those disastrous accidents too frequently occurring upon our railways.

The "Perfection" Pipe.

We show in the accompanying illustration a novelty in the line of stove pipe, which has many features of excellence. It is the easiest applied and most perfect fitting pipe which has come to our notice. It supplies the want which has long been felt of a stove pipe which can be put together by anyone without trouble or vexation, and which can be kept in stock in quantity without taking up any considerable share of valuable room in the shop of the dealer. In the "Perfection" pipe these qualities are secured in the simplest and best way. By the use of machinery every joint is made exactly like every other, so that the lengths are perfectly interchangeable, and no tools are needed in putting them together. A feature of great commercial importance in connection with the manufacture of this pipe is its compactness. One hundred joints can be shipped in two crates 10x24 inches inside. In this form the pipe can be shipped at fourth class rates of freight, with great economy to the dealer. Owing to its compactness the dealer can

ern Kentucky. It is also proper to state here that the State has been imperfectly prospected, and that it is altogether possible, and indeed probable, that the ores of one or another of these varieties will be found to be much more extensive and valuable than at present supposed.

The Iron Ores of Eastern Kentucky.—The ore districts of Eastern Kentucky, where the ores have been manufactured, are two, known as the Red River and the Hanging Rock iron regions. The Red River iron region embraces portions of Estill, Lee, Powell, Menifee and Bath counties. The ores found in this region are the Clinton ore, and an ore stratified, resting upon the sub-carboniferous limestone at the base of the coal bearing shales. It is found both as carbonate, or clay ironstone, and as limonite, or brown hematite. It is this ore which has been most largely worked, and upon which the excellent reputation of the iron from this region has been made. The Clinton ore has not been so extensively worked, but the principal deposit of it is situated geographically near this region, and may be said to belong to it. The best known deposit of this ore in Kentucky is in Bath county, on the waters of Slate Creek, and is known as the Slate Furnace Ore Bank. It is a stratified deposit of oolitic fossiliferous limonite, capping several hills in the vicinity. It reaches a thick-

Silica and insoluble silicates.....11.530
Combined water.....12.300
.....100.142

Metallic iron.....49.042
Phosphorus......707
Sulphur......012

The dyestone ore, a fossiliferous hematite, extends along the flank and foot-hills of the Cumberland Mountain in Virginia, just across the State line from Kentucky, the crest of the mountain forming the line for about forty miles. It lies in two or three beds, ranging from six inches to three feet or more in thickness, and forms in the aggregate an enormous mass of cheaply obtainable ore. This ore, although situated in Virginia, is of the greatest importance to Kentucky, as it is destined to be smelted with Kentucky coals, which lie on the opposite side of the mountain, and are the only coals accessible to the ore, as there is no coal to the south of the mountain. This ore, although somewhat phosphatic, is easily worked, and yields from forty to fifty per cent. of iron. From this ore, smelted with stonecoal, iron will probably be made as cheaply as in any region of the country. The great Pine Mountain fault, which extends from some distance south of the Kentucky line in Tennessee, in a course about north thirty degrees east

cipally for car wheel purposes, as it is of very great strength and chills well. The following analyses show the character of the ore of this region:

No. 1.	No. 2.	No. 3.	No. 4.
Iron peroxide.....66.329	63.535	74.127	65.591
Alumina.....12.532	2.798	3.542	5.762
Lime carbonate.....trace	.450	.300	trace
Magnesia......173	1.073	.461	.218
Phosphoric acid......799	.537	.601	.447
Silica and insoluble silicates.....9.720	20.400	9.530	10.230
Combined water.....9.580	9.800	11.270	11.000
Total.....99.043	100.673	99.971	99.914

Metallic iron.....46.440
Phosphorus......309
Sulphur......012
No. 1. From the Richardson Bank, Clear Creek, Bath county.
No. 2. From Logan Ridge, Estill Furnace, Estill county.
No. 3. From Thacker Ridge, near Fitchburg, Estill county.
No. 4. From Horse Ridge, Cottage Furnace, Estill county.

The above analyses were made by Dr. Peter and Mr. J. H. Talbott, chemists of the Kentucky Geological Survey, from samples selected by the writer.

THE HANGING ROCK IRON REGION.

The Kentucky division of the Hanging Rock iron region at present embraces the whole or parts of Greenup, Boyd, Carter and Lawrence counties. The ores are stratified carbonates and limonites, occurring in the

lower coal measures, beginning with the ore just described, resting upon the sub-carboniferous limestone and extending through six hundred to seven hundred feet of the coal measure strata. The ores are mineralogically similar, but differ somewhat in their physical character and circumstances of deposition. They are popularly known as limestone, block and kidney ores. They usually occur at well defined geological levels, but do not always form connected beds. They also differ in thickness, ranging from four to eight inches in some of the thinner beds to fourteen feet in one local deposit. This latter is the Lambert ore of Carter county. The most common thickness is from six inches to one foot. There are from ten to twelve ore beds which are of more than local extent in this region. In addition there are numerous local beds, one or more of which is found at nearly every furnace. This region supports eleven charcoal and two stonecoal furnaces.

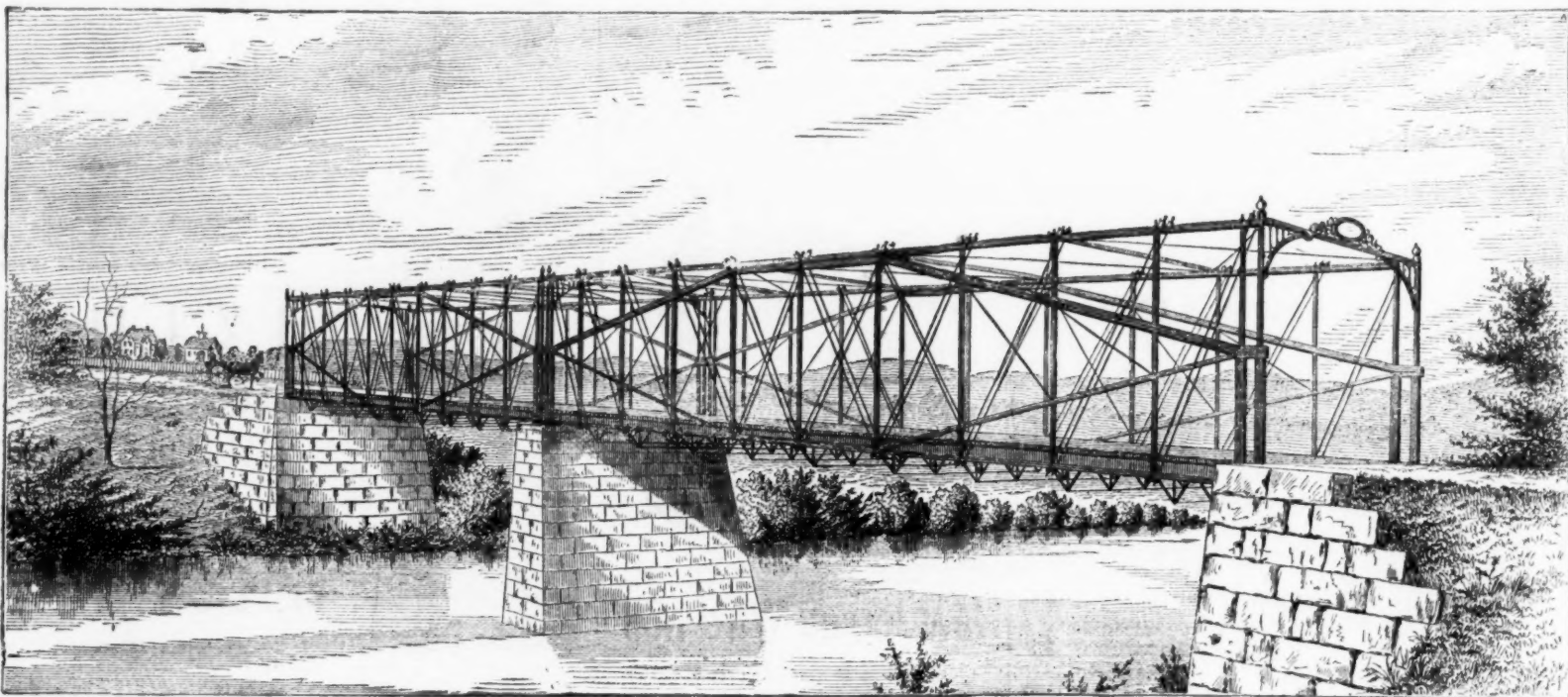
The following analyses by Dr. Peter and Mr. Talbott, of the Kentucky Geological Survey, show the composition of some of the ores of each class in this region:

No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.
Iron peroxide.....67.819	71.689	54.520	68.928	61.314	66.800
Alumina.....1.100	4.155	2.768	2.768	.420	.470
Manganese brown oxide......980	.090	3.380	.260	.790	.430
Lime carbonate......120	.360	1.380	.080	.380	.340
Phosphoric acid......143	.084	.084	.748	.041	.188
Silica and insoluble silicates.....15.650	12.650	28.300	15.240	21.480	16.530
Combined water.....12.903	10.800	10.800	11.100	11.200	11.720
Total.....100.000	100.139	100.397	100.643	100.054	99.484

* And loss
No. 1. lower limestone ore, Kenton Furnace, Greenup county.
No. 2. upper limestone ore, Graham Bank, near Willard, Carter county.
No. 3. lower block ore, Kenton Furnace, Greenup county.
No. 4. upper or main block ore, Lambert Furnace, Greenup county.
No. 5. lower kidney ore, Mountain Savage Furnace, Carter county.
No. 6. yellow kidney ore, Mountain Savage Furnace, Carter county.

The Hanging Rock iron bears a reputation for excellence for general foundry purposes which is unsurpassed by any iron in the United States. The iron produced is mostly hot-blast charcoal iron, but some of the furnaces are worked with cold blast for the production of car wheel iron. The reputation of the iron of this region is, however, chiefly founded upon its excellence for castings of all sorts. The iron combines in a remarkable degree great strength with fluidity in casting and non-shrinkage on cooling. The stonecoal iron of this region is used almost entirely for the manufacture of bar iron and nails. The

[Continued on page 5.]



DOUBLE SPAN WROUGHT IRON BRIDGE, COMBINING ELLIPTICAL TRUSS WITH PRATT SYSTEM.

stow a full season's supply under his counter. The mode of packing is clearly shown in the cut, as also the form and method of joining. The small explanatory cut marked 1 shows the pipe as formed with the seam open; 2 shows the seam closed and secured by the clamp 3, which is of copper. From careful examination of samples of this pipe we speak of it with entire confidence and commend it to the favorable notice of the trade in the belief that it is a valuable improvement upon anything hitherto introduced. The Chicago Stamping Company are manufacturers under the patent, and control the sale of these goods in the United States. The low price at which they offer it will greatly facilitate its introduction.

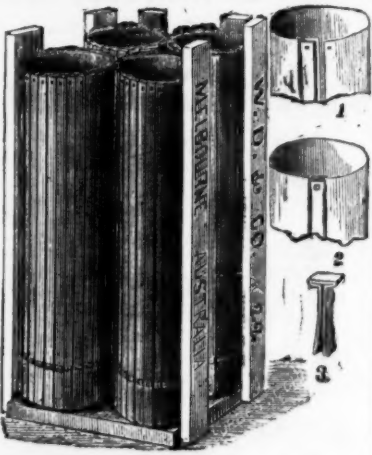
The Coal and Iron Resources of Kentucky.

(Concluded.)

IRON ORES.

The iron resources of Kentucky are extensive and varied. At a few localities a considerable development of them has been attained; but, taking the State as a whole, it has hardly reached a fraction of the possibilities of production. The greater portion of the ore territory of the State is as yet untouched by the pick of the miner, but enough has been done in most of the ore districts to learn the quality and something of the extent of the ores. Geographically the ore districts of the State may be divided into the eastern and western. Geologically the ores of most importance may be divided into three classes; as follows: 1. The Clinton ore of the Silurian period. This is the equivalent of the dyestone ore of Tennessee and Virginia. 2. The unstratified limonites of the sub-carboniferous limestone. 3. The stratified carbonates and limonites of the coal measures. There are also ores associated with the Waverly and Devonian shales in many parts of the State, which have been worked to some extent, but they are of minor importance in comparison with the other varieties of ore. Of the three classes of ore above named the first and the third are found in Eastern and the second and third in Western Kentucky. It may be said also that the ores of the coal measures are the best developed and of the most importance in Eastern, while the unstratified limonites of the sub-carboniferous limestone are of the greatest value in West-

ness of fifteen feet at places. The area covered by the ore at this point is somewhat over forty acres, and the total amount of ore about one and a half million tons. The ore bears evidence of having been formerly a hematite, similar to the dyestone ore of the same geological horizon along the great valley from New York to Alabama, but it has lain so long, unprotected by anything except a slight covering of earth, that it has absorbed water and been converted into a limonite. This deposit seems to be somewhat local—at least, of this thickness—as it grows thin and finally disappears in this neighbor-



THE "PERFECTION" STOVE PIPE.

hood. The limestone which bears the ore is, however, present in a narrow rim all round the central part of the State, and it is probable that, when thorough examination is made, other deposits of the ore will be found. The following analysis by Dr. Peter and Mr. Talbott, of the Kentucky Geological Survey, of a sample of ore from this deposit, shows the composition of the ore:

Iron peroxide.....70.060
Alumina.....4.540
Lime carbonate......040
Magnesia......021
Phosphoric acid.....1.620
Sulphuric acid......031

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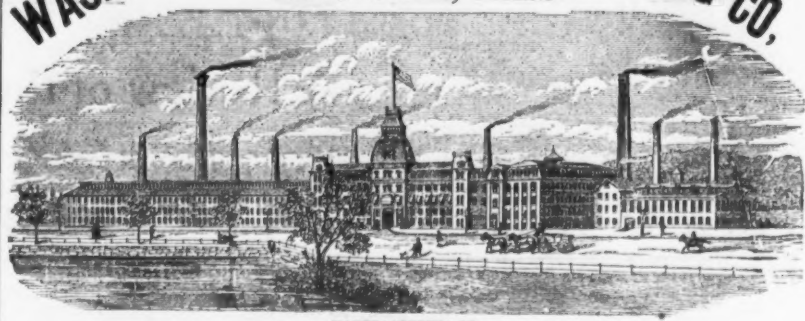
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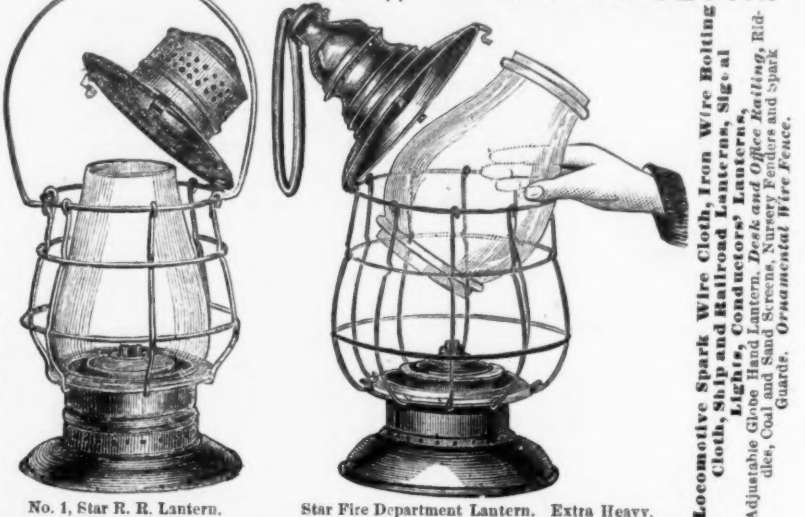
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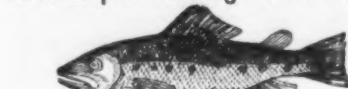
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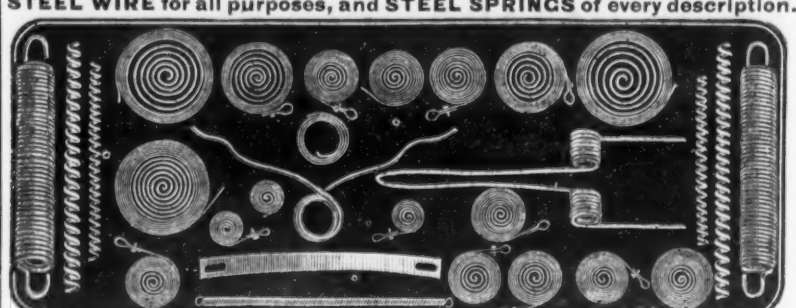


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**Concerning Some Peculiarities in the
Composition of Iron.**

IRONMASTERS' LABORATORY,
339 Walnut Street, Philadelphia.
Mr. Editor: In your issue of the 7th of
June last there is an abstract of proceedings
of the May meeting of the American Insti-
tute of Mining Engineers, in which appears
a report of an address of Prof. J. Lawrence
Smith, "Concerning Some Peculiarities in
the Composition of Iron." These peculiari-
ties are given seemingly as if they had been
quite recently discovered, no mention being
made of their having been known before.
Possibly the report itself is a mere abstract,
and by too much omission injustice has been
done to Prof. Smith; yet, since the publica-
tion no reference to it has appeared in *The
Iron Age*. Upon the subject of "Carbon
as Combined with Iron," the report makes
him state: "My researches have led me to
consider that it exists in three conditions,
the first as combined, and the other two as
graphitic, but the two graphitic forms differ-
ing in several respects." He is correct in
his consideration, but the fact of the apparent
existence of the three conditions was not un-
known before. There is, first, the graphitic;
second, the semi-graphitic, and third, the
combined or amorphous. The first always
exists in the gray pig irons and abundantly
in what is known as *kish*, and in the foliated
carbides of iron found occasionally in the
crevices of the in-walls of blast furnaces. It
is regarded as insoluble in sulphuric and mu-
riatic acids of strength sufficient to dissolve
iron, and is not always readily combustible.
The second or semi-graphitic is found fre-
quently in partly or badly puddled iron and
in other irons imperfectly worked or refined,
and also in "Siemens-Martin" steel when
the bath has been made with more or less
gray iron, or when gray iron has been added
to the bath and the working has been bad.
Its peculiarity is that it is not at once soluble
in acids, but will completely dissolve if the
boiling be continued for some twenty or
thirty minutes after all the iron associated
with it has been dissolved. If the solution
be filtered directly after the iron has been
dissolved, the substance then may be sepa-
rated, washed, dried, weighed and quickly
burned away. It is this second condition of
carbon which causes at times so much varia-
tion in determinations by the colorimetric
method. The third, or so-called combined
carbon, is at once soluble in acids, and with
the iron solution will pass through the filter. These
three conditions have been known for some
time.

Again, upon the subject of "The Ease and
Rapidity with which the Character of the
Carbon of Iron may be Changed," Prof.
Smith appears to have "instanced the mak-
ing of two castings from the same cupola,
and at the same moment as nearly as practi-
cable, but one in a sand mold and the other
in a chill. The metal was the same in all of
its physical and chemical characteristics pre-
vious to casting—the same composition and
temperature. The chill casting was chilled
completely through in its thinnest parts; the
un-chilled parts had a gray, mottled appear-
ance. A portion of the casting completely
chilled was crushed and analyzed, and
showed about 3 per cent. of carbon, all of
which was amorphous or combined. A piece
of the casting made in sand was examined in
the same way, and the total amount of car-
bon remained the same, but it now existed
in three conditions, only about one-fourth
being amorphous and the rest graphitic, but
not uniform. One portion of it would burn
in oxygen readily, the other only with great-
est difficulty and only after heating. This
latter was a scaly graphite, the other granu-
lar."

Surely it cannot be claimed there was any-
thing new or worthy of special note in the
change the iron underwent by the two meth-
ods of casting. Chill casting may be re-
garded as almost coeval with the process of
smelting itself. Analyses time and again
have been made of such irons to find what
difference or change took place in their con-
stituents, and usually no other change than
what is above stated was found. But in
case where the metal contained a high per-
cent. of sulphur there was found in some in-
stances that rapid chilling caused the sub-
stance to be most abundant in the center of
the pig. A difference of the material of
which the molds are formed, it is known, will
sometimes cause a change not only in the
quantity of the carbon, but also in the quan-
tities of some of the other constituents.

But that no change in the physical charac-
teristics of the metal took place by the man-
ner of casting as stated, if a fact, is new in-
deed. It may be apprehended, though, that
either the language of the speaker was mis-
understood by the reporter or that the Pro-
fessor himself had not tested the samples for
tensile strength or power to resist sudden
blows or a crushing force, or had not tried to
drill or file them. If either of these tests
had been applied, a change, and a marked
one, would have been found beyond ques-
tion.

And again, according to the report, Prof.
Smith stated "that some of the graphitic
carbon can be washed out with water, sam-
ples of such washings being shown in a vial."
It has long been known that when gray pig
iron is drilled and pulverized and then sifted,
the fine particles will be richer in graphite
than the coarse ones; and so when the pul-
verized metal is blown upon the portion that
flies off the farthest will be richer in graphite
than the remaining heavy portion. With
the use of water, of course a partial separa-
tion may also be effected, as the heavier me-
tallie portion will fall at once to the bottom
of the vessel, and the lighter graphitic por-
tion will for a time remain suspended and
may be turned into another vessel and col-
lected. The fact that a partial separation
by mechanical means can be made, is not
new. The experienced analyst has long been
aware that it will not do to sift gray cast
iron borings and take only the fine portion for
his work; that if he does so his results will
not be truthful.

And again, Prof. Smith appears to have
called attention to silicon in iron, and in-
stanced as something new a piece of metal
from Kentucky. The statement is: "On
testing it I could get no reaction with nitric
acid nor with several other reagents. With
aqua regia I dissolved about 15 per cent. of
the piece treated, but with great difficulty.
In chlorine it remained intact. In iodine it

remained five days as bright as when first
treated, and with no diminution of weight.
I attacked it first with caustic soda and hy-
drochloric acid, and succeeded in making an
analysis showing 16 per cent. of silicon and
the rest nearly all iron, there being a trace
of manganese and half of one per cent. of
carbon, the scale form."

From this it may seem just quite possible
that Prof. Smith had a piece of the white
close-grained metal that was produced in the
interior of this State some two or three years
ago, samples of which were at the time va-
riously distributed as those of a new alloy
of iron, that was likely to prove of great
value because of its capability to resist oxida-
tion. It may be made by fusing in a cruci-
ble cast iron surrounded with lean fluxes
iron ore in which quartzose sand predomi-
nates, and repeating the process with the same
metal several times. After the fifth or sixth
fusion the metal becomes very beautiful and
no longer resembles ordinary cast iron. The
samples referred to were mostly in small sticks
and oblong buttons, bearing full evidence of
having been fused. Some of them tested re-
mained passive for a considerable time in
several acids. The passivity was found by
analyses more or less full to be mainly, if
not entirely, due to an almost invisible coat-
ing of glass composed of nearly pure silica,
which acted as a protector to the metal; but
I am not aware that any high per cent. of
silicon was found. When finely pulverized
the particles were readily acted upon by hot
acid.

The report continues: "Alluding to the
theory that the use of pig rich in silicon in
the Bessemer process was to make fuel, he
said that its use for this purpose was by in-
direction. I regard the silicon as a flux. As
we blow the air into the molten metal all the
carbon is burned out. The air then oxidizes
the iron, and the silicon fluxes this oxide
and rises as a silicate, leaving the metallic
iron." By this the true theory would appear
to be that the silicon is not oxidized by the
blast at all, but only by coming in contact
with the oxide of iron formed by the blast
after all the carbon has been oxidized or
burned out. Can such be accepted when it
is known by a series of analyses that the
main portion of the silicon in pig iron is
oxidized in the puddling furnace even before
all the carbon is—that it is the first to go and
not the last.

And lastly the report says: "In explain-
ing the origin of what is known as *lucksot*
iron, sometimes found in pig, he stated that
it was wrought iron, and always had been,
and had never been cast. The flux at the
time it was formed had been too basic, and
had surrounded the iron as reduced and kept
it wrought." The name "*lucksot*" iron
has generally been applied to the separate
particles of metal which collect occasionally
in considerable quantity in the crucible of
the furnace above the molten mass of metal
and at the bottom of the slag, and runs out
after the cast has been made, and may be
found in the runner, though at times found
with the slag also. The particles sometimes
are beautifully spherical, white and resem-
ble new bird shot; they are not unfrequently
of considerable size. It is not uncommon for
the particles to mat and adhere pretty closely
together, and in such case they are small and
most variable in shape. Analyses of the
separate shot have shown them to be cast
iron, while other analyses of the small ad-
hering particles have shown the latter to
contain very little carbon. The slag, when
much "*lucksot*" is formed, has been found
by analyses sometimes to be very sulphury,
but at other times not so. Usually it is
somewhat thick and ropy, and, owing to this
fact, it has been supposed the shotty parti-
cles as we find them occur. The metal, as it
percolates through and falls from the mass
above, is struck by the blast and formed to
some extent into spray, the slag not being
sufficiently fluid holds some of the finer parti-
cles, and being itself a collection of oxides,
causes a partial oxidation of the silicon and
carbon of the suspended shot metal. It has
never been accepted as a theory that fluid
wrought iron is first formed in the blast fur-
nace, which becomes cast afterward by com-
bining with carbon.

The difficulty with the shot may be cured
at once by fluidizing the slag, and this last
has been done most readily by adding to the
burden a small per cent. of an ore of iron
rich in oxide of manganese.

J. BLODGET BRITTON.

The New Jersey Steel and Iron Company
has brought suit against the New York El-
evated Railroad Company to recover a balance
of \$47,582.47 and interest, due for iron
work. The defendants, in their answer,
alleged that the plaintiffs had agreed to ac-
cept for the claim the notes of the Elevated
Railroad Company, indorsed by John F.
Tracy, and payable in three, six, nine and
twelve months. The plaintiffs had after-
ward, however, refused to accept such notes.
The property of the defendants, it is averred,
is subject to a mortgage of \$1,750,000, and
the Elevated Railroad Company has also a
floating debt of about \$228,000, which it
cannot pay. Judge Sandford said that upon
the affidavits submitted, he entertained no
doubt that the defense in the action is a
sham. Under the act of Congress passed in
1875, however, he felt himself constrained
to declare the cause removed to the United
States Circuit Court.

A volume of reports on the Philadelphia
Exhibition was issued June 25 by Messrs.
Sandford, Archer and others acting for Eng-
land. The Duke of Richmond and Gordon,
in his report to the Queen, says: "The ac-
tion of her majesty's government and the
efforts of the exhibitors have been most suc-
cessful in cementing the bonds of union be-
tween the two nations. I am afraid that
owing to the universal depression of trade
last year the efforts of the British exhibitors
at Philadelphia did not meet with so much im-
mediate commercial success as could have
been wished, but I trust that the extended
knowledge of British productions which will
result from this great exhibition will eventu-
ally lead to a large extension of trade be-
tween the two countries to the advantage of
both. The expenditure in connection with
the exhibition was \$42,500 less than the esti-
mate."

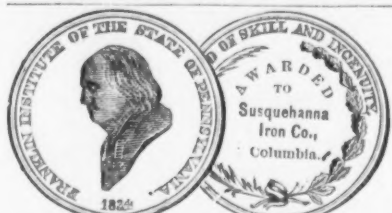
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[Continued from page 1.]

The Coal and Iron Resources of Kentucky.

stonecoal iron is made from the ores of this region mixed with a considerable proportion of ore from other states. The fuel used is the celebrated Ashland or Coalton coal. It is a dry burning, non-coking coal, which is used raw in the furnace, and is of such excellent quality that no admixture of coke with it in the furnaces is necessary, as is the case with most of the other non-coking furnace coals of the West. The charcoal iron is manufactured exclusively from the native ores, which yield, as shown by the books at a number of the furnaces, for periods ranging from one to four years, an average of between 31 and 32 per cent. of iron. The ores of the region are known as limestone, block and kidney ores. These names are due to peculiarities of structure or position, rather than to any essential difference in chemical composition. As a rule, however, the limestone ores are the richest and most uniform in quality. The kidney ores are next in value; while the block ores present greater variations in quality than any other, some of them being equal to the best of this region, and some so silicious and lean that they cannot be profitably worked.

THE IRON ORES OF WESTERN KENTUCKY.

The most extensive and best developed ore region of Western Kentucky is called the Cumberland River iron region. It embraces the whole or parts of Trigg, Lyon, Livingstone, Crittenden and Caldwell counties. The ores of this region are limonites found resting in the clay and chert above the St. Louis or sub-carboniferous limestone. They occur in deposits of irregular shape and uncertain extent, but in the aggregate the amount of ore is immense. The ores are distributed with great irregularity throughout this region, but they seem to be found in greatest abundance and quantity where the limestone has been most extensively worn away, and where, as a consequence, the clay and chert which are the result of its decomposition are of greatest thickness. The ores are, perhaps, found in greater abundance in the country between the Cumberland and Tennessee rivers than in any other portion

greater development than it has yet attained. The charcoal iron manufacture will always be an important and extensive industry, for over a large part of the region the most profitable use that can be made of the land is the production of timber for charcoal. There is destined at no far distant day to be a large stone coal or coke iron industry established here, using the ores of this region with the coals of the Western Kentucky coal field, either raw or coked. The best known of the Western coals at present are too sulphurous for use in iron making without previous separation from sulphur by washing and coking. It is through the introduction of modern machinery and ovens, by which these operations can be cheaply and thoroughly effected, and a coke fit for iron smelting produced, that the coal and iron ore of Western Kentucky will be most profitably and extensively developed. The Louisville, Paducah and Southwestern Railroad affords direct communication between the coal and ore fields. Already measures are in progress for the erection of extensive coke works on the line of this railroad, which will doubtless prove but the first step in the successful development of a different form and more extensive iron industry than any yet established in Western Kentucky.

THE NOLIN RIVER DISTRICT.

In Edmonson and Grayson counties, north of Green River, between Nolin River and Bear Creek, is an area of considerable size called the Nolin River District. The ores of this region are stratified carbonates and limonites, found near the base of the coal measures. The ore of most value occurs above the conglomerate. It is about four feet thick, and so far as present developments indicate, underlies an area of large extent. It is almost wholly undeveloped. A number of years since a small charcoal furnace was established on Nolin River, but it was so far from market, and transportation of the iron was so uncertain and expensive, that the enterprise soon failed. It ran long enough, however, to establish the fact that an excellent iron could be made from these ores. The following analyses, by Dr. Peter and Mr. Talbutt, show the quality of a sample of this ore from near the head of Beaver Dam Creek, in Edmonson County:



ELLIPTICAL TRUSS WROUGHT IRON BRIDGE.—For Description See Page 1.

Iron peroxide.....	52.926
Alumina.....	4.792
Manganese.....	.210
Lime carbonate.....	.180
Magnesia.....	.425
Phosphoric acid.....	.355
Sulphuric acid.....	.143
Silica and insoluble silicates.....	30.580
Combined water.....	10.400
Total.....	100.011

Metallic iron.....	37.048
Sulphur.....	.154
Phosphorus.....	.057

In addition to the great amount of timber available for charcoal, stonecoal in abundance occurs in the same region. This coal is the lowest of the series, and is of most excellent quality, analyses showing it to be far superior to the higher coals of Western Kentucky, which are the ones more generally mined. This region is now more accessible than formerly, as it lies within fifteen miles of the Louisville, Paducah and Southwestern Railroad; but the lack of transportation facilities directly to it has prevented its development. The aggregate amount of ore, coal and timber suitable for charcoal in this region is immense, and it offers great opportunities for development. It is one of the most richly endowed undeveloped iron regions of the State. In many other localities in the Western coal field iron ores have been found, but they have not been thoroughly prospected, and little is known of their extent. One of the best known localities of this sort is in Muhlenburg County. In this county are found, at Airdrie Furnace, on Green River, and at Buckner Furnace, near Greenville, deposits of so-called black band iron ore, a ferruginous bituminous shale, yielding about 30 per cent. of iron. At Airdrie Furnace this ore rests immediately above an excellent coking coal, and the two can be mined together very cheaply. At this place iron can be produced very cheaply by bringing ore from the Cumberland River region and using it in admixture with the native ore. For a more detailed description of this locality see report in the second volume, new series, "Kentucky Geological Reports, on the Airdrie Furnace." The above described localities embrace all the most important iron ore districts of the State. There are numerous ore deposits at other places, some of which have been worked, but, in comparison with the others, to a small extent only. For more detailed information in regard to some of these districts, the reader is referred to the volumes, first series, "Kentucky Geological Reports;" to the "Report on the Iron Ores of Greenup, Boyd and Carter counties," in the first volume, second series; to the "Report on the Geology of the Nolin River District," in the second volume, second series; to the forthcoming reports on the iron ores in the vicinity of Cumberland Gap, and on the iron ores of the Red River iron region, in the fourth volume, second series, "Kentucky Geological Reports."

After four years litigation, a case has been decided in England which is of interest as

establishing a well recognized principle of law. It determines that when iron is passed by a buyer's engineer and a certificate given, the consumer has thenceforward no right to sue for damages for any defects which may afterward appear. In 1871, Messrs. Hopkins, Gilkes & Co., of Middlesbrough, contracted to supply a large quantity of iron rails and fish plates to an Anglo-Russian railway company—the Dunaberg-Witepsk. The rails were rolled under the superintendence of a representative of the engineer (Sir John Hawkshaw), and he watched them at every step, testing them whenever he chose. The rails were completed according to contract, and Sir John Hawkshaw gave the necessary certificate, after which payment was made. The rails were laid down, and after standing the severity of a Russian winter, various defects were noticed in them. The railway company at once sued the manufacturers for £90,000 damages, for what they alleged to be breach of contract. This was in 1873. The matter was referred to arbitration, and the arbitrator, Mr. J. B. Maule, Q. C., decided in favor of Messrs. Hopkins, Gilkes & Co.; but before making his award he stated a special case to the law courts, raising the question as to the finality of the engineer's certificate. In delivering their opinion on this, the judges unanimously agreed that the plaintiffs' right of action was destroyed when the rails had been completed and certified as being according to specification.

News From Abroad About the American Tariff.

The New York correspondent of the Sheffield Telegraph writes as follows, under date of June 16th. If there was any truth in the statements made they would be even more interesting than they are:

I think it scarcely likely that any one of these newly-arrived Sheffield visitors know anything of a movement that is quietly, and almost secretly, going forward here semi-officially on the part of the Hayes administration for the modification of the tariff. In conversation the other day with two very prominent New York merchants, one a Democrat, the other a Republican, both greatly respected by the administration, I was

assured that the cabinet have under consideration a plan for the appointment of a commission charged with the duty of obtaining information in reference to the action of the present tariff, so that a tariff treaty can be arranged between the principal European countries and America, that shall be satisfactory to all the countries concerned therein. The same authority informs me that the iron, steel and leather trades are to have very prominent and full consideration in reference to these negotiations. I would therefore venture to suggest that it would be well for Sheffield manufacturers to consider who would be the best men among them to put prominently forward, so that the Sheffield trade shall feel that they are properly represented in this commission. It has been suggested to me, by those who know Sheffield well, that Mr. Thomas Jessop would be an eminently proper man for so important a duty. I think it not unlikely that in the course of a week or so I shall be able to give you further details of this administration proposal, and probably to name the New York commissioners who will be chosen as representatives of the American iron and steel interests.

This movement is not a mere scheme founded on political aspirations, but is entirely characteristic of the Hayes' administration. It "means business," and nothing but business. It has been conceived entirely in the interests of the manufacturers of the country. There is marvelous increase of converts to the revenue tariff instead of the protective tariff, and the desire is largely fostered by persons who have hitherto been known only as free traders. Already in New York there has been formed a new trade organization, known as the New York Free Trade Club. Its officers have been selected from men of considerable mercantile and social prominence. Such an organization cannot fail to have an influential control over the counsels of the Hayes' cabinet.

Nails from old Rails.—A manufacturer at Wheeling, West Va., is reported to be making a good quality of nails from old rails. Samples were some few days since shown at the office of the Wheeling Intelligencer, part of which were made out of rails, pure and simple, and part out of three parts rails and one part muck bar. They are pronounced good, and are smooth and tough and drive well. This process of making nails, we learn, avoids the process of boiling iron. The rails are cut and piled for the heating furnaces, like so much muck bar, and by the use of a flux in the heating process are welded and made as malleable, ductile and close textured in the sheet rolls as so much piled muck. The same paper says, also: "We lately mentioned that Colonel Powell is making nails at the Bellville Mill out of the old rails and one-eighth muck iron, and that he claims to have an advantage equal to \$13 per ton for pig metal. If this turns out to be the case, the furnaces will not have much to do for some time to come, inasmuch as it is estimated that there are enough old rails in the country to run all the mills for several years."

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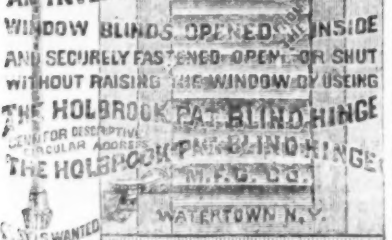
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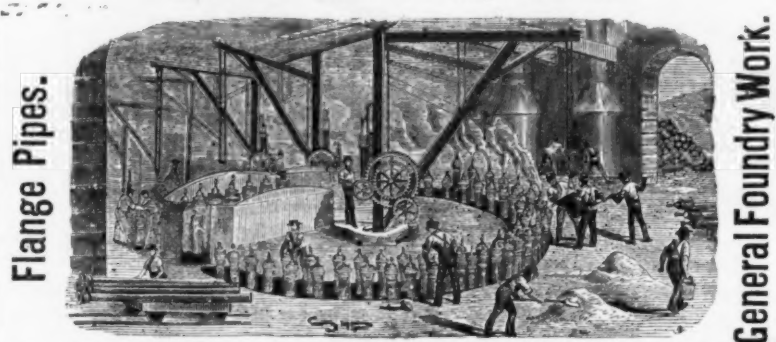
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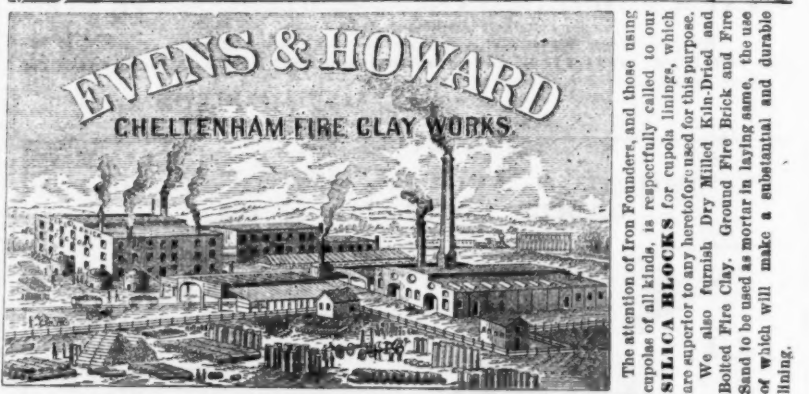
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Awarded the GRAND MEDAL of PROGRESS at WORLDS' EXPOSITION, VIENNA, 1873, being the highest awards on Pumps, &c., also, highest medal at PARIS in 1867, and Philadelphia, 1876, accompanied by Report of Judges.

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Manufacturers of all styles Plain and Ornamental Butts,

LOOSE PIN REVERSIBLE,

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Drilled and Wire Jointed, Japanned, Figured Enamelled, Nickel Plated and Real Bronze Butts. Also a full line of

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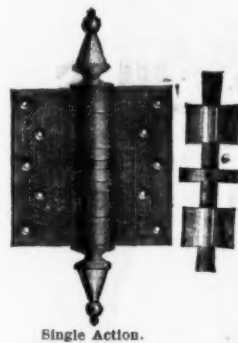
Garden, Well, and Force Pumps, Yards, Drives, Well, Garden Engine and Steam Roller Pumps, Hydraulic Rams, etc., and all with the most modern improvements.

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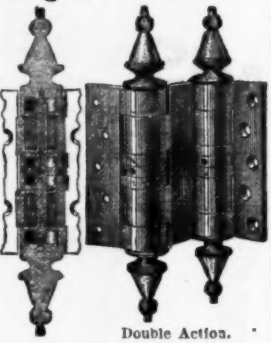
This Hinge has two flat coil springs, very powerful. It has a heavy solid pin, giving much less friction than a hollow pin. It has broad, solid bearings in the knuckle, which do not wear down readily and let the door sag. It is Fast Joint, therefore can be used for either right or left hand. By actual test it has an average of 50 per cent. more power than other Spring Hinges in common use of same size.

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These Pumps have enormous power, and are for the house or for out-door wells of any depth. They are constructed with special regard to strength, ease of working and durability. They can be immediately changed from lift to force pumps, and the air chamber can be revolved, so as to allow the handle to work at an desired angle with the spout. Having close tops, they cannot be tampered with. Attention is called to our new elegant pattern Deep Well Non-Freezing Fire Pump. Also, Blunt's Sand Vacuum Chambers—a complete protection against sand or gritty water in dug or driven wells, pits, mines and rivers. For hand or steam pumps, all sizes, from 1 1/2 inch to 4 inch suction pipe. Send for circulars to
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The Oldest Shot Tower in America.
FOUNDED JULY 4, 1808.

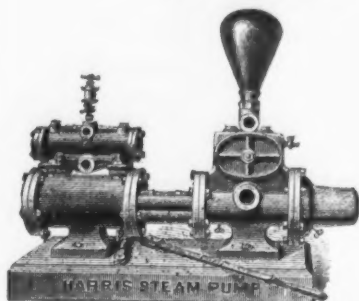
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STEAM
PUMP.****A DOUBLE-ACTING
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Adapted to every Situation.

**THE
GREATEST EFFICIENCY
Coupled with the
Simplest Mechanism.**

OFFICE OF CROOK'S HOTEL,
NEW YORK, DEC. 18, 1876.

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GENTS.—It affords me pleasure to state that the "Harris Steam Pump" furnished by you for my Hotel is fully up to your guarantee, and is a perfect success. It pumps water to the upper story of the Hotel, an elevation of eighty (80) feet, with a steam pressure of less than fifteen (15) pounds; it is perfectly noiseless in operation, and differs from any pump that has been used by me in the same situation, in that it does not "telegraph" on the pipes running through the Hotel, and on that account alone is invaluable.

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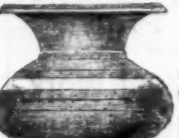
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Centennial Award

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for the manufacture of the Japanese Paperware, Water Pails, Chamber and Commode do. (slop Jars), Foot Baths and Water Carriers, Bowl and Pitcher, Pans, Basins, Cuspidors, Spittoons, &c., &c.



Warehouse, 373 Pearl St., N. Y. City.
Trade supplied.

New Patents.

We take from the records of the Patent Office in Washington the following specifications of certain patents lately issued, which will be found interesting:

IMPROVEMENT IN PROCESSES OF ANNEALING CASTINGS.

Specification forming part of Letters Patent No. 188,189, dated March 6, 1877, issued to John S. Robinson, of Canandaigua, New York:

This invention relates to a process for the treatment of cannon, shafts, rollers and other castings before removing them from the flasks or molds in which they are cast, such treatment consisting in applying pulverized charcoal, or coal of any other kind, which will be ignited by the heat contained in the casting when such coal is reduced to the requisite degree of fineness, the material to be applied while the casting is at as high a degree of heat as is practicable, or as soon as the sand can be removed from its surface without causing a change of form, the object being to prevent the too rapid cooling of their surfaces and the consequent crystallization and weakening of the metal upon such surfaces. It is a well known fact that when heavy castings, such as ordnance, shafts, or rollers, are made in the usual way, their outer surfaces cool first, and frequently become quite solid in their character while the metal at their centers is still in a plastic or semi-liquid state, and hence it follows that when the central portion cools the tendency

position the flask will be constructed to part at its center, and have upon still ends run-ions, one-half of which is upon each of the parts of the flask resting in boxes, formed in suitable stands, so that it may be turned over, the object being to provide for the removal of one part of the mold or the sand in the same, and the supplying of its place with coal, and then to turn it upon its bearings, and repeat the process, the partitions in the flask forming supports for the casting after the mold or the material constituting it has been removed.

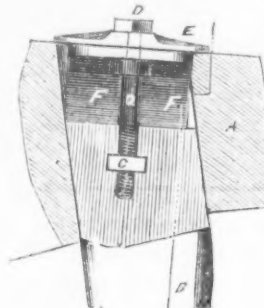
In making castings to be treated by this process it is desirable to form them in what are termed dry sand molds, but the process is not limited to castings thus made, as the molds and the material used in forming them relate rather to convenience in casting than to the invention.

Claim.—The herein described process for treating cannon shafts, rollers and other castings, it consisting in the application thereto of pulverized coal before removing them from the positions in which they are cast, and while they are at a red heat.

We take the following abstract of new patents, recently issued, from the official record:

TOOL HANDLE.

To L. H. Roberts, Morley, Mich.—May 22.
—The tool is attached to the handle by means of a slotted wedge having a rabbeted cap plate, through which passes a screw bolt provided with a rigid collar, which works in



an enlargement of the slot in the wedge, and a nut loosely fitted in a transverse mortise in the part of the handle which enters the eye.

The screw bolt D, having collar G and end nut C, in combination with the handle B and wedging device E F.

The following trade-mark was registered during the week ending May 22:

4681.—Leather Belting and Lace Leather.—Charles A. Schieren, Brooklyn, N. Y.
"The representation of a bull's head."

Tests of New Zealand Pig Iron.

The London Iron Trade Exchange says: At the celebrated iron works of the Shelton Bar Iron Company, Stoke-upon-Trent, some very interesting experiments have just been made. They consist of some New Zealand pig iron being worked up and tested. The pigs have been smelted from metallic sands found along the beach of New Plymouth, in Tarariki, where the New Zealand Titanic Steel and Iron Company have erected two blast furnaces. Messrs. T. W. & G. Walker, of Wolverhampton, having received some sample pigs, they entrusted them, as stated above, to the Shelton Bar Iron Company to work up and test both puddled and finished bars. This having been done, the Shelton Bar Co. have reported on the result of their experiments. They state that on three of the pigs being broken they exhibited a good mottled fracture. In the puddling furnace they worked remarkably well into wrought iron, and as they were slender, averaging 75 lbs. each, against 1 cwt. generally, did not occupy too much time in the working and baling up. The heat was divided into two balls and rolled into a couple of 4 inch bars five-eighths thick. In the process of puddling much thickish cinder was evolved, which (taken in conjunction with the smallness of the quantity of pig worked), accounted, no doubt, for the deficient yield. This was found at the rate of 1 ton 3 cwt. 3 qrs. 14 lbs. of pig to 1 ton of puddled bars produced, or nearly 20 per cent. loss, while ordinary good and sound pigs lose about half the percentage. The pig iron weighed 2 cwt. 10 lbs., and the puddled bar produced was 1 ton 3 cwt. The puddled iron was afterward worked in the bar mills in the regular way into one inch round and one and a half flat, pieces being cut off for testing in various ways. In the hot testing process the round specimen was cut down the center with a chisel of a certain distance, and each half turned outward. A hole was then punched lower down one-sixteenth of an inch larger than the diameter of the bar, and another hole of the same size was punched in the opposite direction of the grain a little further on. When in the hot flat, the bar was flattened at one end on edge to a disc two and a half inches diameter, and on flat at opposite end in the same way. A hole was then punched in the middle of the bar one-sixteenth in diameter larger than the width of the bar. The actual specimens showed the iron to be perfectly free from red-shortness. The cold tests were pieces of both round and flat, being doubled over and fractured, and they showed a freedom from cold-shortness, &c. The tensile tests indicated that the iron was exceedingly ductile, the flat having contracted in area nearly 50 per cent., or 3 1/2 inches in a foot. The ultimate stress was also very good, being respectively 23 and 23 1/2 tons per square inch. From these trials (most of them being the British Admiralty requirements for "best best" bar iron, whose tensile is 22 tons per square inch, whereas this iron stood 1 and 1 1/2 tons above it), it is considered that the iron is remarkably well adapted for the better class of engineering and smith work. The samples stood the tests remarkably well. The sample pigs were common cinder, while from the tests enumerated above, the finished iron having stood our "best best" trial, would be worth about £11 per ton. At Tarariki the pigs are selling at about £3. 10. per ton, but whether their production will seriously interfere with our Antipodean trade time alone will show.

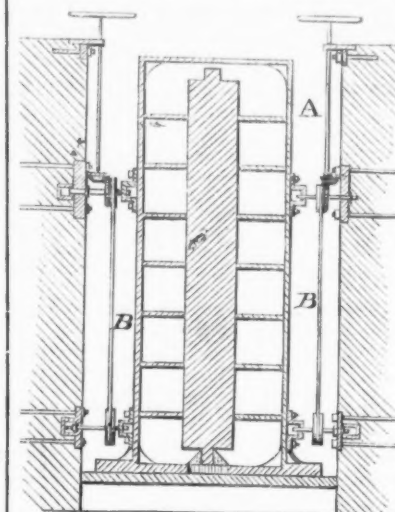


Fig. 1.

is to cause such portions to shrink away from the outer portions, thus causing upon the intermediate portions an undue strain, the result of which is an elongation and consequent weakening of the crystals of said intermediate portions.

By the improved process the surfaces of such castings are kept at a high degree of heat until the radiation from the central parts has been such as to reduce the crystals thereof to nearly or quite the same state as those at or near the surface, thus allowing all parts to shrink or contract alike from that point, and thus insure a compression of the crystals at all parts, instead of elongating or straining them.

Fig. 1 represents a vertical section of a flask suitable for containing the mold for a shaft to be cast in a vertical position, and Fig. 2 a cross section of said flask.

A Fig. 1 refers to the pit in which the flasks may be placed, they being of such dimensions as may be required for the kind of work to be done. B B are the flasks, which are to be made in sections, so as to allow them to be parted at their centers. The sections of these flasks may be provided with mechanism, as shown, or with any other that will serve the purpose required, which is the withdrawal thereof from the surfaces of the

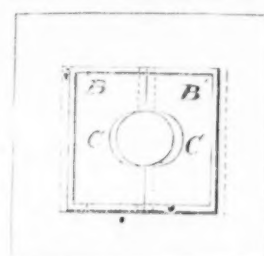


Fig. 2.

castings to such a distance—when the same has become so far cooled as to permit it to be done without a change of form thereof—as to leave a space, C, between it and the inner surfaces of the mold, into which the pulverized coal is to be put, in which position the whole is to remain until the casting is so far cold as to justify its removal. The machinery shown for removing the flasks and the molds from the castings consist of a shaft, I, the upper end of which is secured to the upper surface of the pit, and is furnished with a crank or wheel for turning it, while upon its lower end there is placed a beveled wheel, which meshes into a similar wheel placed upon a horizontal screw, which passes through a nut secured to the flask. This vertical shaft may be extended down so as to carry upon its lower end another wheel similar to the one above described, which shall mesh into a wheel upon a screw placed near the lower end of the flask, or motion may be communicated to the lower screw by means of pulleys and a belt, as shown. The flange upon the lower ends of the sections of the flask may be made to run upon rollers, or they may be made to slide upon the bottom plates of the pit. For supporting the pattern while in the mold, and the casting after it is formed, it is proposed to place a block of metal in the bottom of the pit, or to place there plates of metal of such dimensions as to answer the purpose, their upper surfaces being large enough to allow a sufficient amount of the mold to rest thereon to prevent the metal from flowing out when the casting is made.

When the articles are cast in a horizontal

USE THE BEST.



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Goods of all known manufacturers have been repeatedly tested, and interesting tables have been compiled showing the working qualities of files made by different makers, and of files made from different steels, and with various shapes and angles of tooth. They have thus reduced the manufacture of files to an exactness and perfection with a uniformity of result, as they believe, never before attained. No file, foreign or domestic, that they have ever tested, has equalled the performances of their own goods taken at random from their stock. Their machines are capable of the most delicate adjustment, and can produce the very finest work known to the trade. Special files made to order. Prominent file manufacturers are having their best goods from our works.

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Have Proved their Great Superiority.

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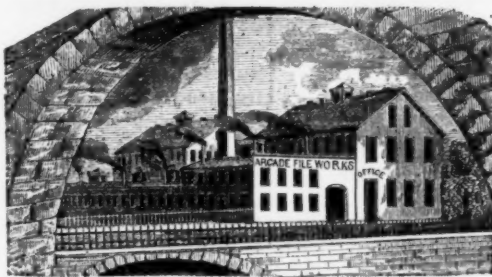
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ESTABLISHED 1848.

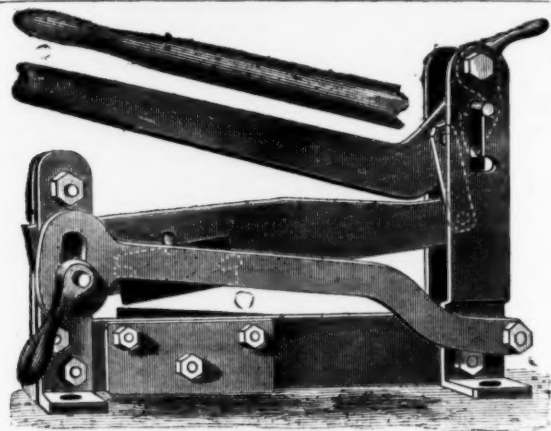
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Quality guaranteed by written warranty
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PATENT WROUGHT IRON SHEAR.

When not in use occupies a space 6x30 inches, and in use the same space with sufficient room to bring down the lever. Weight 180 pounds. Knives have no holes in them, and can be taken out in three minutes. Can be renewed at the mere cost of the steel. One set of knives should last several years. Guaranteed to cut, readily, Iron Bars 4x½, 6x½, 1½ round, 1½ square; will also cut Plow Steel.

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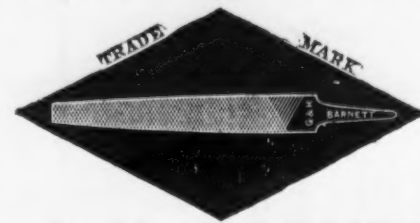
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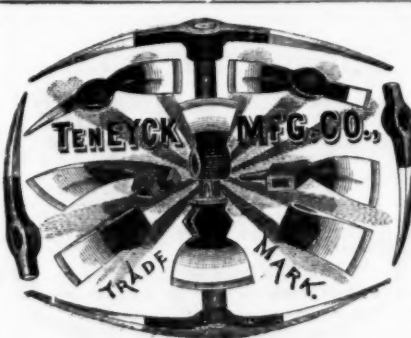
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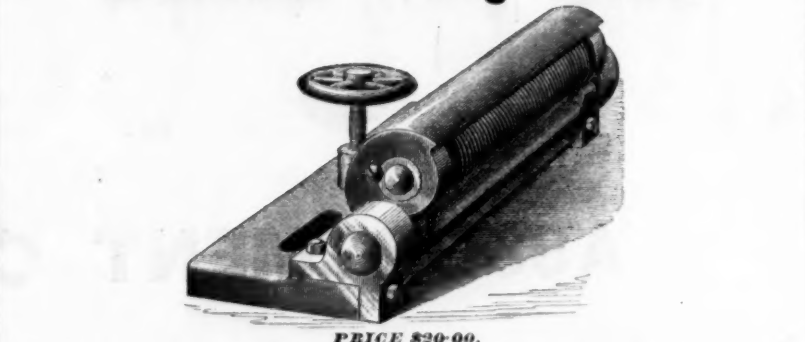
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constantly in good shape. This can be instantly applied to the face of the stone, working automatically,
without interfering with the constant use of the stone, and does the truing without raising any dust.

The Late John Jones.

The Iron and Coal Trades Review pays
the following tribute to its late editor, John
Jones, whose death was announced in our
last issue:

It may safely be said that a more widely
known man than Mr. John Jones could not
be found in connection with the iron trade,
not only of the North of England, with
which he was specially intimate, but with
that of the whole kingdom, and his merits
will be greatly missed at Middlesbrough,
where he carried on the greater part of his
business, and there will be many in that
town to say, "we shall never look upon his
like again." It will be difficult if not impos-
sible to meet with a man who can conduct
such a multifarious business as Mr. Jones
had—such a number of kindred societies
whose interests were so much bound to-
gether. He was a man of such marked
ability that the offices which he has held
seem to have grown to him, and, undoubt-
edly, he was peculiarly fitted for them. His
administrative faculties—his powers of or-
ganization—were shown in the foundation
and working, more particularly, of the Iron
and Steel Institute. He was certainly the
moving spirit and regulator of almost every
association pertaining to the great iron
trade of the North of England, and it is there
that his loss will be most felt. Truly, he can
ill be spared.

For eleven years the deceased acted as sec-
retary to the two iron trade associations of
the North England—the Cleveland Ironmas-
ters' Association and the North of England
Iron Manufacturers' Association. When he as-
sumed the office in 1866, the trade was in a
most disorganized condition by reason of the
great strike and of the depression in trade
generally, and Mr. Jones found his task
no light one. However, by his great
ability he materially assisted the masters
in adjusting their difficulties, and he has
ever since proved himself invaluable to
them. In 1869 Mr. Jones was one of the
foremost in helping to found a board of arbi-
tration for the manufactured iron trade of
the North of England, and he ably seconded
the efforts of Mr. David Dale, the first pres-
ident, in making the organization a success.
He, from the establishment of the board up
to his death, was the secretary of the board
on behalf of the employers, the late Mr. Kane
acting in the same capacity for the opera-
tives. He held very strong views on the
subject of arbitration in wages matters, and
spent much time and energy in furthering
the scheme, and with so much tact did he
conduct his delicate duties on the board, that
both employers and workmen will acknowl-
edge that they have lost one of their best
friends. The board has been an undoubted
success throughout, and strikes have been
well nigh unknown of recent years. It was
in the year 1869 that the subject of our
memoir saw the need for a technical society
for the iron and steel trades specially, and he
made a suggestion at a meeting at Newcast-
le-on-Tyne which was heartily responded to,
and the Iron and Steel Institute was then and
there established. Mr. Jones being appointed
secretary. He had very arduous duties to
perform in connection with this Institute—as
all must who desire to make a new society a
success—and he had the satisfaction of seeing
the organization become one of the chief
technical societies in the kingdom, compris-
ing among its members 1000 persons, some of
them the most learned authorities in the
trade. Those who have accompanied the
Iron and Steel Institute on its provincial ex-
cursions will be able to appreciate fully the
services of their indefatigable secretary, and
to acknowledge that it will be almost impos-
sible to find a man who can fill his place.
The Journal of the Institute, which he ed-
ited, is well known to scientific men all over
the world. Another society Mr. Jones was
instrumental in founding, and which will
ultimately be of much value to the iron
trade, is the British Iron Trade Association,
which was formally inaugurated last year.
The Iron and Steel Institute takes up tech-
nical and scientific matters only, and the
British Iron Trade Association deals with
commercial questions of interest to the iron
trade. During the last year the latter as-
sociation has proved a very useful organiza-
tion for watching treaty business and bills
before Parliament, and has shown the far-
seeing judgment of Mr. Jones. Locally the
deceased was secretary of the Exchange
Company, the Cleveland Club, the Chamber
of Commerce, the Freighters' Association,
&c., and the fact that these are in a flourish-
ing condition, notwithstanding the bad
times, speaks well for his business tact and
ability.

Mr. Jones was an accomplished geologist,
and was member of the Geological Society of
London. In private life he was one of the
best hearted of men, and drew around him a
large circle of friends who will deeply de-
plore his removal from our midst. He was
never backward in engaging in any work
which would tend to the public good, and
those coming in contact with him in business
will not be slow to acknowledge his merits.
The deceased was connected with several
field clubs and literary societies, and he was
mainly instrumental in establishing the Tees
Valley Field Club. He had literary abilities
of no mean order, but his only work in book
form, except the Journal of the Iron and
Steel Institute, was a standard book on "The
Geology of the South Staffordshire District."
Notwithstanding his multifarious duties in
connection with the iron trade, Mr. Jones
found time not only to conduct this journal,
but he also edited the Middlesbrough News.
His views in political matters were decidedly
liberal; nevertheless they were of a tolerant
character, and thus he respected the views
of those who differed from him in this re-
spect. Altogether, the life of the deceased
has been a most hardworking and useful one,
and he will undoubtedly leave behind him
"footprints on the sands of time."

Puddling with Coal Dust.

The Coal Trade Journal says: Experi-
ments are being made at the works of the
Towanda Iron Manufacturing Company, at
Towanda, Pa., with the culm or dust of the
Loyal Sock mines. This coal is called a
semi-anthracite; it looks very much like the
bituminous coal in the vicinity of the works,
but lacks the bitumin, is remarkably free

from sulphur, and contains over 90 per cent.
of carbon. The first trial made with the
culm was under the boilers, and it was
quickly demonstrated that more steam could
be generated with it than with coarse coal;
and not only so, but that it could be done in
less time and with a lighter weight of fuel.
Experiments were next made in puddling
iron. A common double puddling furnace
was used, temporary alteration having been
made for the purpose. The fire box was
lengthened from twelve feet to twenty-one
feet, so as to increase the grate surface, this
being necessary from the fact that the fire
must be kept very thin—not over three
inches. The grates were placed close to-
gether, and contained numerous small holes,
their diameter being about the eighth of an
inch. In a bar three to four inches wide
and two and one-half to three feet long,
there would be from 400 to 500 of these
holes, and there was about two feet of dead
surface between the grate and the bridge
wall. These were the only alterations made,
the furnace itself not having been changed.
The fuel was introduced in the ordinary
way, only it was necessary to spread it very
evenly over the grate, and a blast was used.
The person who is conducting the experi-
ments says he can get up steam and melt
iron quicker with this fuel than with any
other coal he ever used, and the iron pro-
duced is claimed to be of a superior quality,
owing to the freedom of the fuel from sul-
phur. The works are twenty-five or thirty
miles from the mines, but the owners of the
latter offer to deliver the culm at a price not
to exceed eighty-five cents per ton. Further
experiments are to be made, and we hope
soon to be able to give additional particulars.

An Improved Squeezer.

Mr. Jeremiah Head, M. Inst. C. E., com-
municated the following to the Cleveland
Institution of Engineers on the above named
subject:

When many years ago, Mr. W. Menelaus,
of Dowling, was experimenting with
his rotary puddling furnace, he gave consid-
erable attention also to the question of how
best to consolidate and clear of cinder the
large masses of crude wrought iron which
were likely to be produced. Having had
great experience in squeezing as then per-
formed by the Jerry Brown squeezer, he
naturally inclined toward dealing with the
iron in that way rather than by hammering.
His puddling furnace not being, as he can-
dily admits, a commercial success, he did
not go so far as to construct a squeezer, but
still he matured to a great extent his ideas
as to what it should be, and made a wooden
model embodying these. This model he ex-
hibited at the Middlesbrough meeting of the
Iron and Steel Institute. Since that time
Mr. Danks' squeezer, which is very different
in many respects, has been adopted at cer-
tain iron works, and with fairly satisfactory
results. Mr. Price, of Woolwich, also has
made some valuable experiments to deter-
mine the best form of squeezer, and these
are understood to be still in progress. Other
engineers have been and are at work in the
same direction. Among these the writer has
given the subject some attention, resulting
in the design which was brought before the
Cleveland Institution of Engineers at their
last meeting. The leading principles of Mr.
Menelaus' squeezer had been adhered to, but
the details of Mr. Head's machine are new.

The squeezer proper consists essentially
of three rolls, two side by side, with a rotary
motion only, and the third above, having
also a vertical travel of at least 12 in. One
of the lower rolls has a collar, and the other
grooves to suit. The distance between the
collars determines the length of the bloom,
and the final position of the top roll deter-
mines its diameter. The rolls are suited to
blooms weighing about 15 cwt.; but longer
or shorter rolls can be introduced for greater
or less weights. The upper roll is rather
overbalanced, so as to keep it always up
against the screws. The chocks containing
its bearings are hung on bolts through which
two flat bars on edge are threaded. The
ends of these are secured by links to four
levers pivoted to the standards. Balance
weights are strung upon rods at the
other ends of these levers until the required
counterpoise is obtained. This forms a very
compact arrangement, and is free from the
objections which attach to placing the bal-
ance weights overhead or in pits beneath.
The top roll is lowered and raised by means
of the right and left-hand worm wheels
geared into the worms upon the diagonal
shaft, and driven by the quadruple single-
acting engine. The arrangement for work-
ing screws by power was described fully in
the "Proceedings of the Cleveland Institution
of Engineers" for December, 1876. Since
that time it has been put to work in the forge
train at Newport Rolling Mills with com-
plete success. It can be worked by a boy, or
by the roller himself. Of the lower rolls, the
grooved one is to be of steel to prevent dan-
ger of breaking at the grooves. The depth
of the collars in the fellow roll is somewhat
greater than half the diameter of the finished
bloom, so as to prevent any central projec-
tion being left. The piece to be squeezed is
tipped in from a bogie, and the collared roll
will itself deliver it forth upon another bogie
on the top roll being raised and a crowbar
being inserted between the grooved roll and
the bloom. The three rolls are driven
through ordinary coupling boxes and spin-
dles by three pinions, which, in their turn,
are all driven by a small central pinion of
steel. The length of the connecting spindles,
and consequently the space occupied by the
train is determined by the amount of devia-
tion which the upper one can be allowed to
make with the horizontal.

The angle of deviation does not exceed
what is now regularly at work at the above
named mills. The engine driving the
squeezer is an inverted one with variable ex-
pansion, steam jacketed, and carefully bal-
anced throughout for a high speed. It has a
20 in. cylinder by 20 in. stroke, and is in-
tended to run at 120 revolutions. The gear-
ing is 1 to 5, giving 24 revolutions for the
train. At the other end of the second mo-
tion shaft is a provision for attaching a
blooming mill or ordinary forge train. The
engine does not reverse, as this is considered
unnecessary with steam worked roll screws,
for by means of them the pressure can at any
time be removed from the bloom under treat-
ment.

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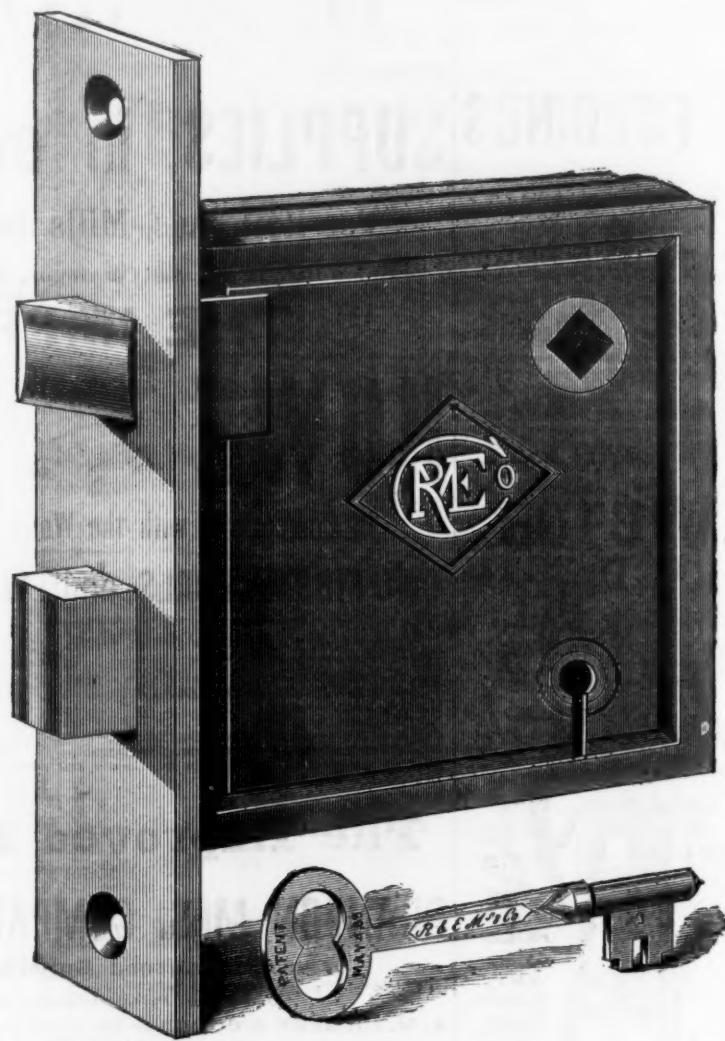
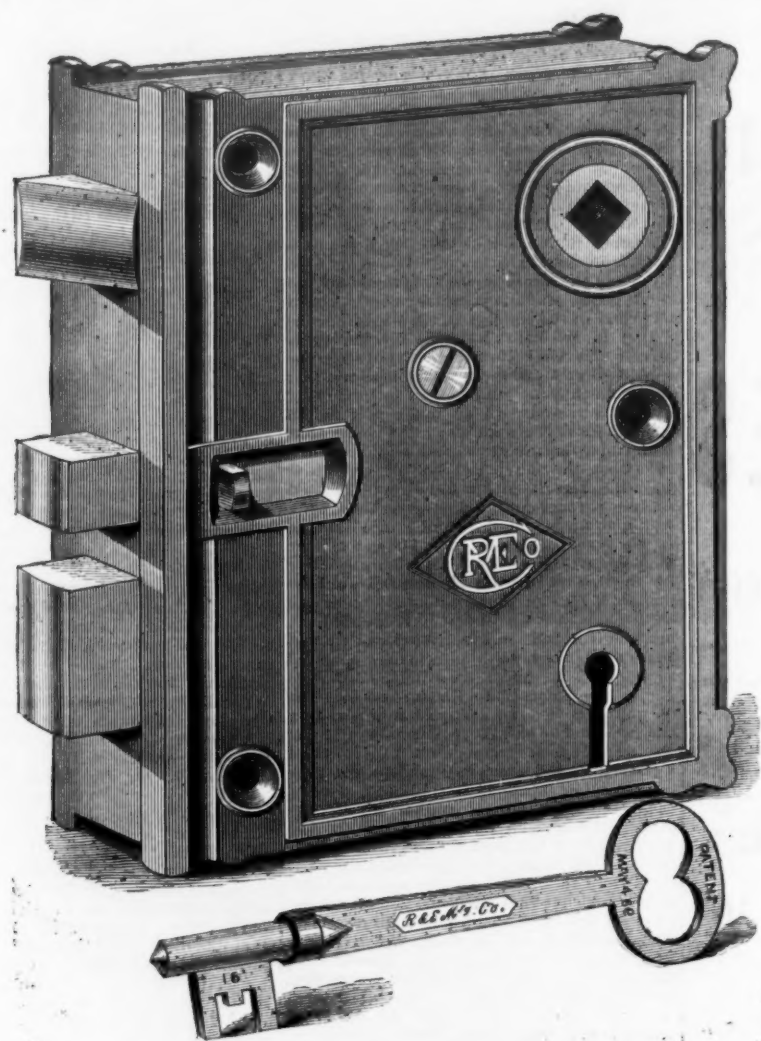
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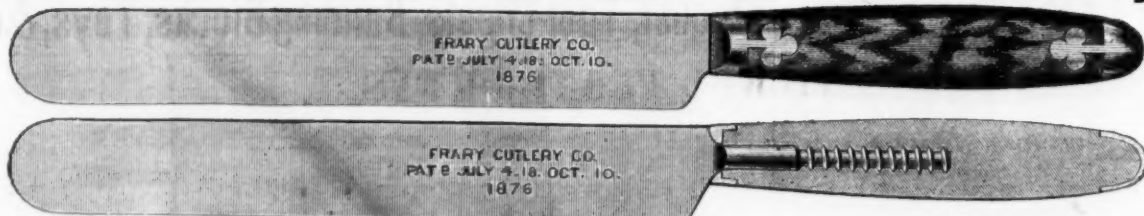
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Five Hundred Dollars Premium for Utilizing Anthracite Coal Dust.

The American Philosophical Society some years since, offered a premium for the utilization of anthracite coal dust. A committee is now considering the claims of an inventor to the premium. The following letter, which explains the matter, has been sent to various persons interested in similar methods of operation:

JUNE 16, 1877.

My Dear Sir: The American Philosophical Society, of Philadelphia, in the year 1866, offered a premium of \$500 for a process for the successful utilization of anthracite coal dust, to be competed for under the direction of the officers of the society.

A committee is now considering an application for the premium, where the process is burning the material on a perforated grate, with closed ash pit and a steam jet blast, the coal slack being spread thin on the grate, the latter portion of the process being secured to Mr. J. E. Wootton, of the Reading R. R., by a patent. If you desire to secure this premium, and will sign and inclose to me the accompanying application, with evidence and description of your method within three months, I will present the same to the society at their next meeting following its reception, and you will be recognized as a competitor before the committee now considering the subject. Respectfully, yours,
ROBERT BUGGS.

The following is the form for an application to the committee to take notice of an inventor's process:

To the American Philosophical Society: I have been informed that a premium has been offered by the society for the utilization of what is known as coal dust.

Without special reference to such a premium, I have had in operation in that direction a process, and the results are so satisfactory, and I think conclusive, that I desire to submit them to a committee of the society for examination and report thereon.

Should my process be deemed worthy of the premium offered, I shall feel highly honored. Respectfully,

Concerning the above Mr. Briggs says: This offer has been a standing one until the present time, but an applicant for the award having presented himself, the society has now appointed a committee to consider the subject. Applications with evidence and description can be sent to the society at any time during the next three months, until which time the action of the committee will be deferred to allow every method proposed or in use to be properly represented in the competition. Considering the almost national importance of the utilization of the immense quantity of waste fuel now accumulated and accumulating in the form of dust at the mines, this step of one of the oldest American scientific societies possesses the highest interest, and the premium offered bids fair to bring to publication the various methods now proposed to accomplish the desired result. The accompanying form will serve to give an idea of what is necessary for an application.

Artificial Fuel.—An improved fuel has been proposed, consisting of peat dust, 125 parts; slimy deposits of rivers, 10 parts; anthracite dust, 1000 parts; schist oil waste, 100 parts; and dry coal slack, 120 parts. Another improved fuel is suggested by Mr. Mallee, consisting of pulverized charcoal waste 80 parts, with 20 parts of pulverized charcoal, which are mixed together, and he then adds 5 parts of nitric acid, 2 parts of nitrate of potash, and 5 parts of gum arabic. The product is considered to be specially adapted for cooking stoves, as it causes neither smoke nor smell. It can be lighted with a match like touchwood, and covered with the other portions of the fuel the combustion continues.

An exchange reports that "a Mr. W. H. Lewis, a Welsh gentleman, of Hafod, near Swansea, has invented a new engine of warfare. It consists of a cannon so arranged as to discharge a sharp sword blade cross-wise in the direction of the enemy, the knife or cutter being so poised in its career through the air as to cover the whole space in a longitudinal direction described by the blade itself. An 8 inch ball would carry a sword 14 feet in length 600 yards, literally mowing down every human obstacle in its path." This invention is rather too late in the history of modern war to be very valuable. In the time of the Great Frederick, when solid ranks were in fashion, it would have been just the thing, but in these later days, when the ranks are very open, there is less opportunity for such a weapon to be of value. A 14 foot sword in an 8 inch ball is a very respectable weapon, however, but the scabbard seems to us somewhat small.

The Canadian protectionists, though obliged to fight the policy of Great Britain and the influence of the Mother Country in the Dominion, and the opinions of many at home who accept the doctrines and adopt the policy prepared for them, make a steady and able fight, and are constantly raising questions it is difficult to answer. The Toronto Mail, premising that the United States has paid three hundred millions of debt in seven years after an exhausting war, and reduced interest from six to four per cent., asks the free traders of the Dominion to explain why it is that the Dominion, having had no war, having enjoyed a semi-free trade tariff on manufactured goods, and almost complete free trade in the produce of the farm and the forest, is obliged to send her Finance Minister to England annually to borrow money for government requirements?—and finds her credit weakening and her debt increasing. The inquiry is legitimate, and its discussion is as appropriate on this as on the other side of the boundary. The facts are indisputable. They might be cunningly explained were the two countries on different hemispheres; but contiguous as they are, and similar as they are in many particulars, there is no good reply which does not impeach the free trade policy by which Canada is exhausted. The comparison deserves to be pondered by those who think the great duty of the next American Congress is to place this country in the unenviable position of the Dominion.—North American.



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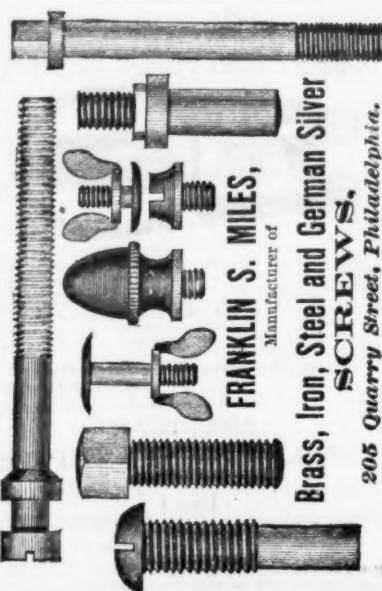
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TO MANUFACTURERS & DEALERS IN SKATES. CAUTION.

A re-issue of letters patent Aug. 18, 1874, No. 154,176, re-issued May 4, 1875, No. 6,410, re-issued Feb. 20, 1877, No. 7,524, application filed Nov. 14, 1876, having been granted to Oliver Edwards, all manufacturers and dealers are notified that they must cease making or selling any skates infringing the same. Special attention is invited to claim 8, "a skate runner having its bottom constructed with a laterally projecting rib and its standards provided with plate supporting brackets, all made in a single piece of metal, substantially as and for the purpose described."

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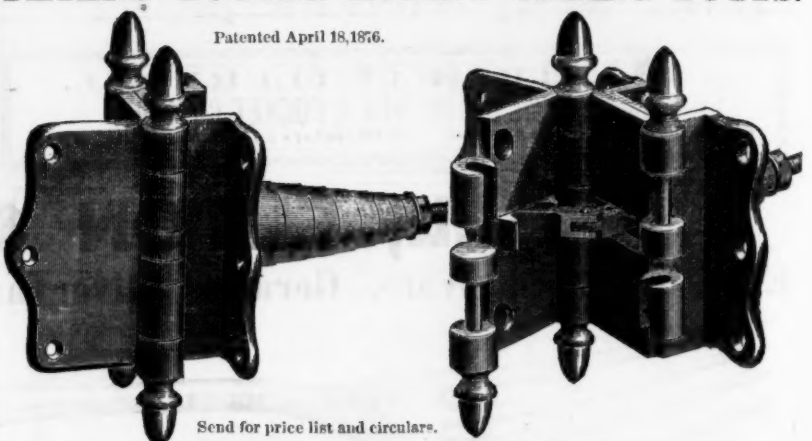
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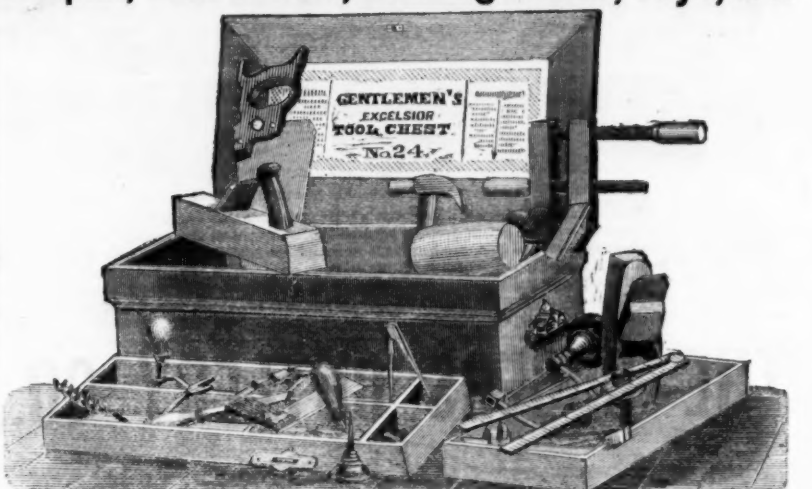
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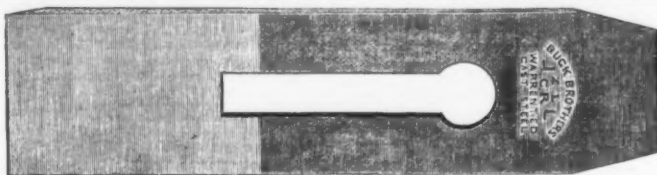
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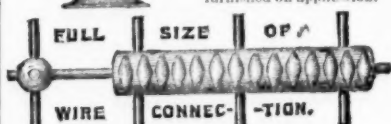
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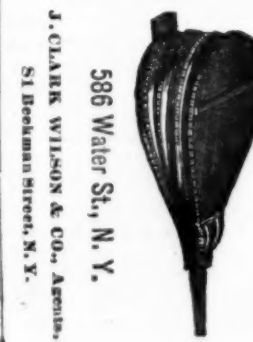
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The Iron Age.

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The Iron Outlook.

The letter of Mr. W. E. S. Baker, of Philadelphia, which we print elsewhere in this issue, merits the thoughtful consideration of our readers in the iron trades. Mr. Baker is one of the most careful and accurate statisticians of the iron trade, and his tables of cost of production for a series of years, published annually in our columns, have become standard authority. Probably no one knows better than Mr. Baker the relation between the average cost of iron and the average selling price, and in pointing out this relation as it exists at this time, Mr. Baker has rendered the trade a service which is none the less valuable because it forces the manufacturer to certain unwelcome conclusions. Mr. Baker believes that, "to avoid widespread ruin to the iron interests and save American labor from pauperism, a large decrease in iron production seems inevitable." This is certainly a safe conclusion to draw from the facts he presents, and one which the ironmaster cannot well escape. The trouble is, however, that each furnace and mill owner would like to have his neighbors stop while he continued running, and as nearly all feel this way, there seems but little probability that many of those now producing will feel inclined to stop until forced to do so by stern necessity. The evils from which the iron trades now suffer are all of a kind which will cure themselves in time; but the remedy is rough, and the sheriff seems to be the one upon whom the task of applying it chiefly devolves. Those who cannot afford to stop making iron to be sold below net cost, are certainly in an unfortunate position. Their course lies between Seylla and Charybdis, and it will require something more than good management to take them safely through the next nine or twelve months. The outlook is certainly gloomy, and the worst feature of it is that there is nothing on which to hang a reasonable hope of recovery. To say it will all come right, sooner or later, is to utter a platitude which cannot do much to revive failing courage, or cure the heart sickness of deferred hope.

Railroads in Europe and America.

Statistics lately compiled from official sources of the business of the railroads of Europe in 1873, the present statistics of lines in Canada, Spanish America and Brazil, and similar figures of the railroads of this country in 1876, furnish the basis for some very interesting comparisons. The following table shows miles of railroad in operation, population and ratio of mileage to population:

Years.	Countries.	Miles.	Population.	Miles per 100,000 inhabitants.
1873.	United Kingdom.....	16,044	31,900,000	50
1873.	Scandinavia.....	1,915	7,900,000	24
1873.	Russia.....	9,093	56,500,000	14
1873.	Germany.....	13,567	41,100,000	33
1873.	Belgium.....	2,104	5,140,000	41
1873.	France.....	11,266	35,340,000	31
1873.	Switzerland.....	899	2,700,000	33
1873.	Italy.....	4,257	27,500,000	15
1873.	Spain.....	3,419	16,700,000	21
1873.	Denmark.....	358	1,600,000	24
1876.	Chili.....	975	2,060,000	49
1876.	Canada.....	5,129	3,718,745	139
1876.	Mexico.....	639	9,343,470	6
1876.	Cuba.....	307	1,414,000	28
1876.	Jamaica.....	27	510,354	5
1876.	Honduras.....	39	351,700	17
1876.	Costa Rica.....	145	185,000	70
1876.	Colombia.....	64	3,000,000	2
1876.	Venezuela.....	8	1,800,000	34
1876.	Peru.....	1,029	3,199,000	32
1876.	Bolivia.....	70	900,000	8
1876.	Argentine Republic.....	1,401	2,100,000	64
1876.	Paraguay.....	45	211,079	23
1876.	Uruguay.....	454	450,000	100
1876.	Brazil.....	18,750	10,700,000	18
1876.	United States.....	73,508	45,000,000	163

As regards the number of miles to the 100,000 inhabitants, it will be seen the United States stand at the head of the list. Next in order is Canada, followed by Uruguay, Costa Rica and the Argentine Republic.

Countries.	Cost in millions of dollars.	Per mile in thousands.	Gross earnings—Millions.	Operating expenses—Millions.	Net earnings—Millions.	Per mile—Thousands.	Dividend, per centum.
United Kingdom.....	\$1,042	\$183	\$888	\$533	\$355	\$6.400	4.6
Scandinavia.....	124	17	14	14	0	3.690	4.1
Germany.....	1,284	94	117	114	3	3.860	4.1
Belgium.....	284	14	16	16	0	3.860	4.1
France.....	1,600	142	107	87	20	7.100	5.0
Switzerland.....	113	16	10	5	5	5.600	4.3
Italy.....	424	98	17	16	1	3.571	2.6
Spain.....	131	20	8	8	0	3.500	2.6
United States.....	3,917	54	497	311	186	2.534	3.3

While in the United Kingdom the cost per mile has been highest, the earnings are ahead of all the other nations specified. The cost has been smallest in Scandinavia, but the net returns are below our own average.

Locomotives.	Thousands of miles run.	Average per locomotive, miles.
United Kingdom.....	11,435	185,599
Scandinavia.....	276	4,746
Denmark.....	61	1,135
Belgium.....	1,500	21,540
France.....	5,354	130,300
Switzerland.....	340	5,398
Italy.....	1,192	16,523

It will be seen that in France there has been accomplished 50 per cent. more by each locomotive than in most other countries.

ROLLING STOCK.	Locomotives.	Passenger Cars.	Freight Cars.	Totals.	Per Mile.
United Kingdom.....	11,435	33,761	323,701	368,897	23
Scandinavia.....	276	728	6,604	7,608	4
Denmark.....	61	165	951	1,177	3
Belgium.....	1,500	5,000	40,000	46,500	32
France.....	5,354	12,500	150,000	167,854	102
Switzerland.....	340	1,037	5,785	7,162	50
Italy.....	1,192	3,919	20,615	25,726	6
	20,158	57,110	547,746	625,014	

In rolling stock per mile, it will be observed, England holds a leading position, closely followed by Belgium and France.

PASSENGERS AND TONNAGE CONVEYED.	Miles in Operation.	Passengers Moved, Millions.	Freight, Millions of Tons.	Passengers Per Mile, Thousands.	Freight Per Mile, Thousands.
England and Wales.....	11,342	492	166	35	15
Scotland.....	2,606	38	25	14	10
Ireland.....	2,095	16	3	1	2
Sweden.....	1,228	4	3	0.4	2
Norway.....	310	1	1	0.4	2
Denmark.....	378	4	1	1.1	2
Russia.....	9,093	21	15	2	2
Prussia.....	8,545	100	87	12	10
Württemberg.....	723	9	3	13	4
Baden.....	823	12	14	14	4
Bavaria.....	1,997	18	8	9	4
Belgium.....	2,104	41	14	20	7
France.....	11,266	117	57	10	5
Switzerland.....	889	15	6	17	5
Italy.....	4,257	26	8	6	2
Spain.....	3,419	12	5	4	2

The following table shows the number of passengers and tons of freight moved per mile:

England and Wales.....	Passengers.	Freight, Tons.
.....	35,399	14,596
Scotland.....	14,395	9,737
Ireland.....	7,796	1,530
Sweden.....	3,284	2,454
Norway.....	2,185	2,185
Denmark.....	11,059	1,656
Russia.....	2,265	1,679
Prussia.....	11,659	10,226
Württemberg.....	13,286	3,666
Baden.....	14,877	3,394
Bavaria.....	9,179	3,967
Belgium.....	19,526	6,648
France.....	10,345	5,102
Switzerland.....	17,374	4,491
Italy.....	6,032	1,738
Spain.....	3,480	1,396

From what precedes it will be seen that the passenger and freight traffic has been most active in England. Belgium is the next in importance.

In 1820 the United States had but 23 miles in operation; in 1840, 2818; in 1850, 9021; in 1860, 30,635; in 1870, 52,898, and last year, 73,508.

AMERICAN RAILROAD STATISTICS SINCE 1870.	Miles operated.	Capital & Funded Debt, Millions.	Gross Earnings, Millions.	Net Earnings, Millions.	Dividends, Millions.
1870.....	73,508	4,460	497	186	68
1871.....	74,759	4,410	503	196	74
1872.....	76,237	4,320	520	199	76
1873.....	77,323	3,785	536	184	67
1874.....	78,323	3,159	465	166	64
1875.....	79,414	2,664	463	142	50

While the gross earnings last year fell off \$5,807,546, the net earnings increased \$946,314, due to the economies in conducting the operations of the roads.

INCREASE OF RAILROADS AND POPULATION IN THE UNITED STATES FOR TEN YEARS, 1867-76.

States.	1867.	1876.	1876.	1876.	1876.
	Miles of Railroad.	Per cent. Increase.	Population.	Per cent. Increase.	Population.
New England States.....	5,694	1,756	3,840,000	3.8	3,840,000
Middle States.....	5,555	5,555	5,555,000	5.5	5,555,000
Western States.....	14,327	14,327	14,327,000	14.3	14,327,000
Southern States.....	10,125	10,125	10,125,000	10.1	10,125,000
Pacific States.....	5,694	5,694	5,694,000	5.7	5,694,000
Total United States.....	77,490	30,276	38,104	97.25	44,738,850

The above table shows that while the railroad mileage has nearly doubled during the past ten years, the increase in population has been only 23 per cent, the railroads having increased more than four times as rapidly as the population. The number of inhabitants to a mile of railroad in 1867 was 925, while in 1876 it was only 577. The experience of the New England States demonstrates that to enable railroads to be profitable a population of at least 550 to the mile is necessary.

ENGLISH RAILROAD STATISTICS SINCE 1870.	1870.	1871.	1872.	1873.	1874.	1875.	1876.
Miles of railway.....	16,659	16,659	16,659	16,659	16,659	16,659	16,659
Cost in millions of dollars.....	\$1,151	\$1,151	\$1,151	\$1,151	\$1,151	\$1,151	\$1,151
Capital stock.....	2,334	2,334	2,334	2,334	2,334	2,334	2,334
Funded debt.....	747	747	747	747	747	747	747
Freight moved (tons) millions.....	200	200	200	200	200	200	200
Receipts from freight.....	166	166	166	166	166	166	166
Receipts per ton.....	\$8.31	\$8.31	\$8.31	\$8.31	\$8.31	\$8.31	\$8.31
Miles run by freight trains (millions).....	105	105	105	105	105	105	105
Receipts per mile from ditto.....	\$1,539	\$1,539	\$1,539	\$1,539	\$1,539	\$1,539	\$1,539
Gross receipts (millions).....	295	295	295	295	295	295	295
Operating expenses.....	161	161	161	161	161	161	161
Net earnings.....	134	134	134	134	134	134	134
Dividends.....	48	48	48	48	48	48	48
Gross earnings per mile.....	17,700	17,700	17,700	17,700	17,700	17,700	17,700
Net earnings per mile.....	8,035	8,035	8,035	8,035	8,035	8,035	8,035
Cost of railway per mile.....	\$19,720	\$19,720	\$19,720	\$19,720	\$19,720	\$19,720	\$19,720
Dividends per centum.....	454	454	454	454	454	454	454

The remarkable steadiness in the percentage of dividends paid in England in the face

of the dull times since 1873, seems to us worthy of notice.

The Statistical Position of Tin.

The past two months have made no important changes in the position of the tin market. The visible supply April 1 was, in England and Holland, 17,260 tons; June 1 it was only about 100 tons larger, as the following figures will show:

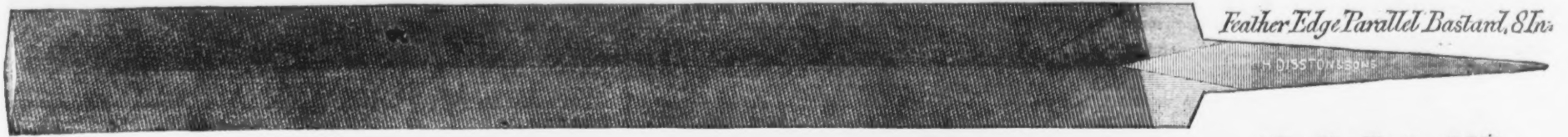
STOCK.	June 1, 1877.	June 1, 1876.	June 1, 1875.
Tons.	Tons.	Tons.	Tons.
London.....	9,522	7,470	5,866
Amsterdam.....	1,558	2,819	3,295
Billiton.....	1,143	987	788
Australian in Holland.....	700	.....	.....
Total.....	13,023	11,276	9,949

As will be seen, prices have been tolerably well sustained in the London market, but there has been a great lack of buoyancy in all the European markets, and from various causes. The deliveries in May, although larger than during the same month of last year, fell considerably short of those in the corresponding period of 1875, with an increased visible supply, as compared with the preceding two years (17,367 tons against 14,651 and 13,384); the supply has become more and more unwieldy, and unless production is considerably curtailed somewhere, tin will decline still further.

The quantity of Australian tin on the way is materially larger than it was in May of the preceding years. As the dull shipping season is now at hand in Australia, it is to be presumed that henceforth the shipments thence may fall off until October. Should they continue steady, the suspicion would gain ground that Australia has begun to produce considerably in excess of former seasons, and there would be no means of preventing an unusually heavy decline. The political outlook in France, which, a month ago, had become doubtful, and even threatening, also to some extent affected general business on the continent while the uncertainty lasted, but the apprehensions of further political disturbances have been allayed. On the other hand, the dull business season now approaches, and we need not look forward to much activity either in Europe or here in any metal, however well situated and cheap it may seem, and as tin is not in a favorable position, much less in this one, the decrease in the production of Billiton tin reported from Holland last month is too trifling to have any effect, the output for the year ending April 20, 1877, having been 59,532 piculs, against 62,000 piculs, 63,000 piculs and 51,000 piculs the previous three years. Reducing the total output of the four years from piculs to tons, it will be found that 235,532 piculs are equal to 14,090 tons. There has thus been an average of 3523 tons per annum, while the production last year amounted to 3561 tons, thus exceeding the average by 38 tons.

Nor does the reduced production of tin plates, small as the item may appear, operate in favor of block tin, unless it should greatly stimulate the demand for plates everywhere and soon induce makers to resume operations with more vigor.

Considering everything, we perceive little that is cheerful in the position of the



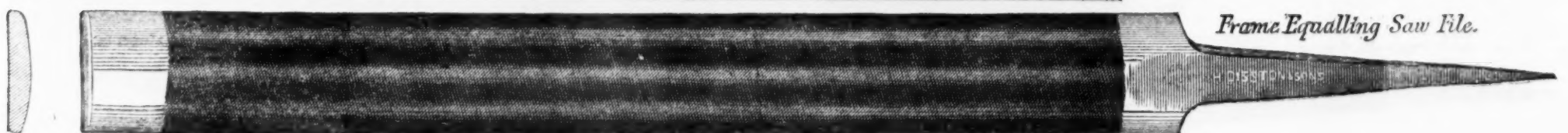
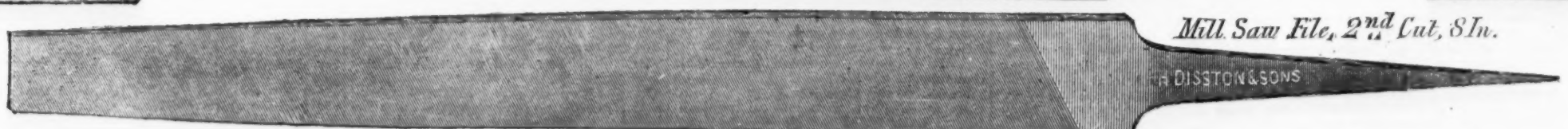
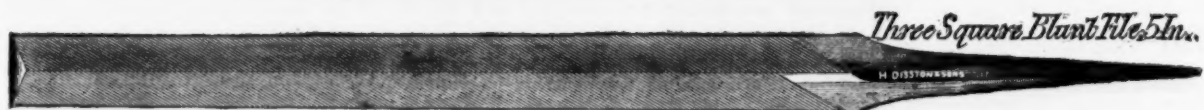
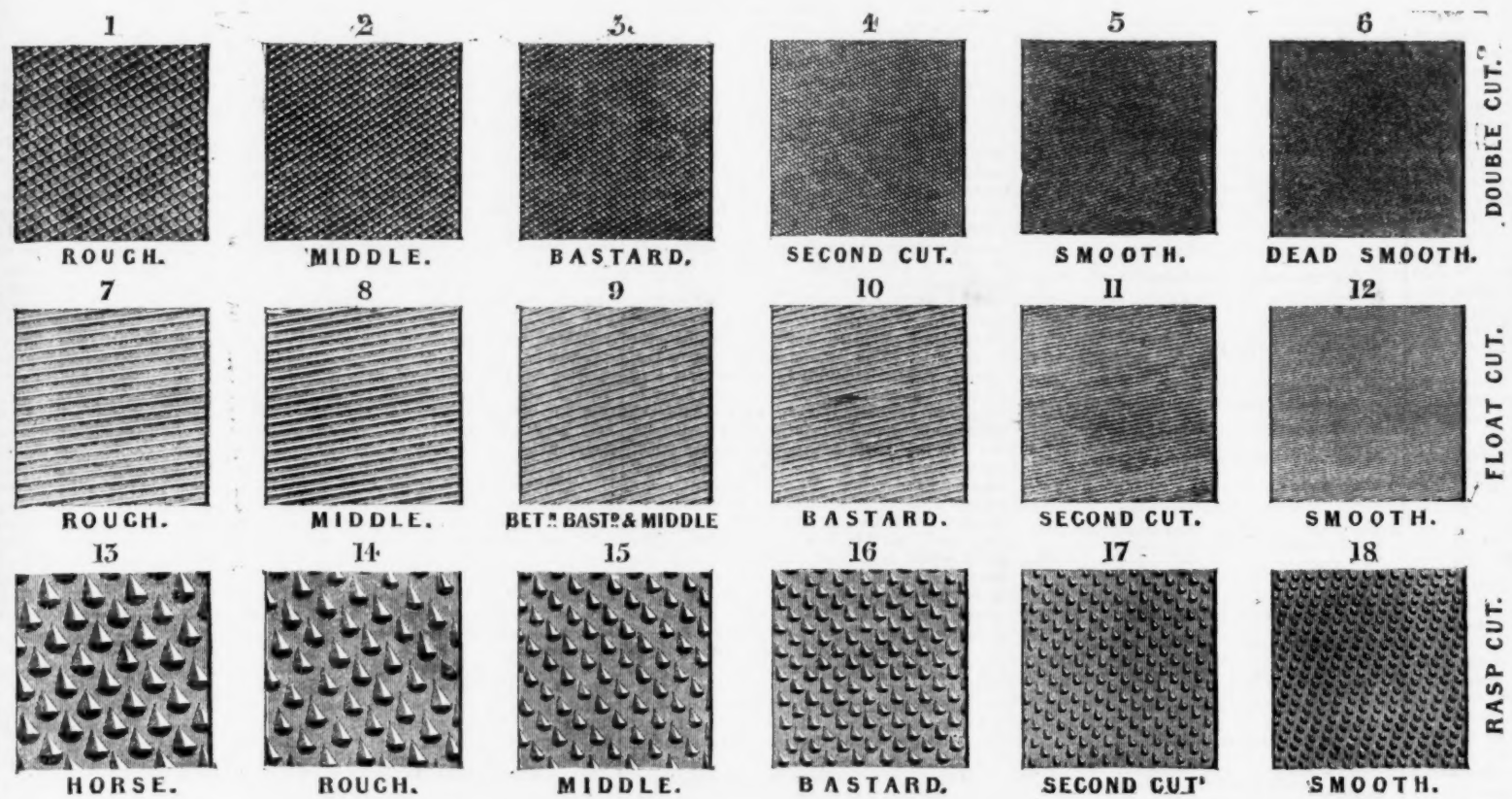
HENRY DISSTON & SONS FILE CO., LIMITED,

Manufacturers of every description of

FILES AND RASPS.

Factory, - - Tacony, Pa.

Office, Front and Laurel Sts., Philadelphia.

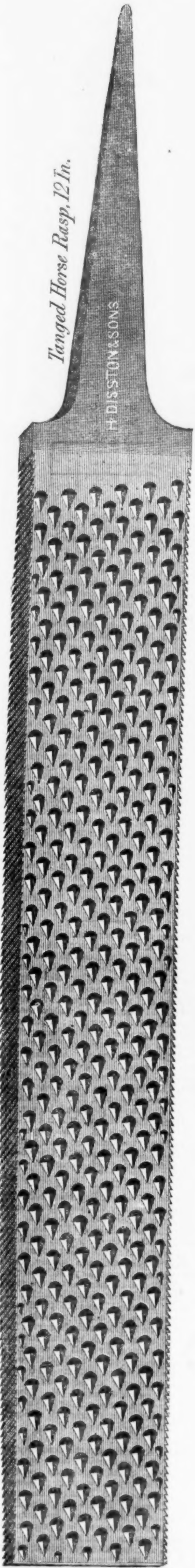


Hand Bastard, New Angle Cut, 10 In.

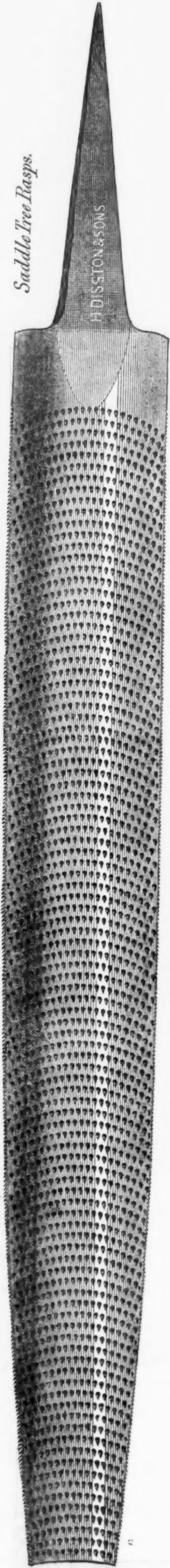
Hand Bastard, 10 In. for Brass.

HENRY DISSTON & SONS FILE COMPANY, Limited, CONTINUED.

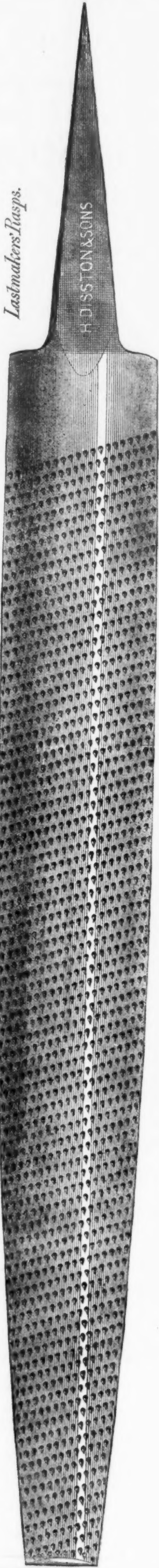
Tanged Horse Rasp, 12 In.



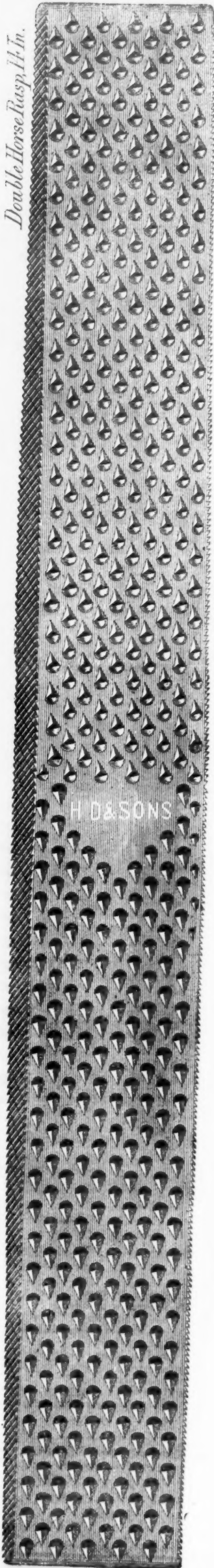
Saddle Tree Rasps.



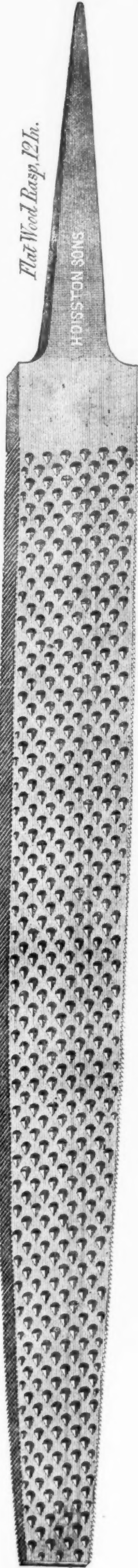
Lastmakers' Rasps.



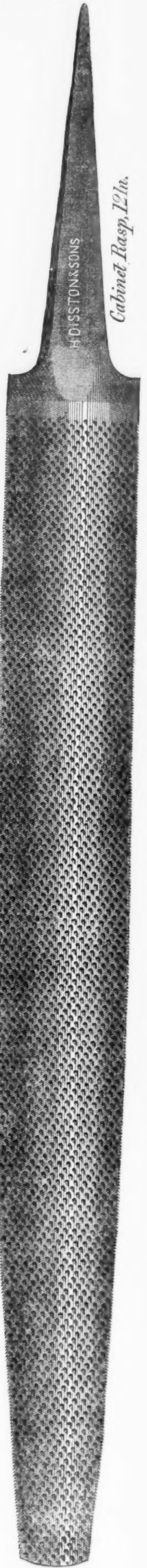
Double Horse Rasp, 14 In.



Flat Wood Rasp, 12 In.



Cabinet Rasp, 12 In.



INDUSTRIAL ITEMS.

NEW YORK.

The Aetna Iron Works on Goerck street, established in 1840 by Mr. John Roach, have been reorganized under the style of the Aetna Iron Company, with Mr. William J. Fryer as manager. Mr. Fryer organized the same establishment in 1860, and during his management it was very successful. The establishment is very large and complete, and is well supplied with plant and machinery. The works will be especially devoted to architectural work and large castings.

The Fletcher Furnace, Buffalo, is nearly ready to blow in.

PENNSYLVANIA.

The Pennsylvania Steel Company, of Harrisburg, have orders sufficient to keep the works running day and night for four months. Twelve hundred hands are employed.

Messrs. E. & G. Brooke, of Birdsboro, and the Phoenix Company, owners of the old Elizabeth Copper Mine, near Knauertown, Chester county, have leased it to Mr. Charles M. Wheatly, of Philadelphia, who will at once open the old shafts and take out the low grade copper ores. Copper is advancing in price consequent upon a foreign war, and the business of mining and smelting this metal has become very profitable.

The Sheridan furnaces, Lebanon (Kaufman & Co.), are now making an iron of such superior quality for blooms, &c., that there is a demand for it from all parts of the country. They recently sent 20 tons to Montana. This superiority is the result of the mixture of the ores.

Over one hundred men are at present employed in the Chester Rolling Mills, manufacturing plate iron.

The blast was put on at the Allen Furnace, Sharpsville, Sunday, the 24th ult., at 11 a. m.

Work is going on at Stewart Furnace No. 2. Speaking of No. 1 (the Stewart No. 1) the *Sharon Herald* says: At the Stewart Furnace No. 1 more can be seen now than when they were shoveling it out. We thought then that the lining had burned out up to the top, but find on more careful examination that it didn't. It burned out only from the top of the boshes, about fifteen feet up, when the top portion settled down gradually, or rapidly—no knowing which—the upper portion being almost as good as when it was put in. This would seem to prove that this particular part of the inside was where the most wear, friction or heat was, and consequently needed a little better material and more careful workmanship in putting it in than the other parts did. Heretofore, with very few exceptions, there was no difference once the knuckle was passed.

PITTSBURGH AND VICINITY.

The South Side glass houses are closing for repairs.

It is rumored that R. C. Schmertz & Co's. Glass Works at Belle Vernon will run all summer.

Arrangements have just been completed, and a contract entered into with Messrs. Totten & Co. to furnish patent hollow chill rolls for the Belmont Works, of Wheeling, and for the works in Aetnaville.

The first shipment of pig iron to Europe has been made, according to a Baltimore paper. Five tons have been sent from Pittsburgh to Antwerp.

Zug's mill is again in operation.

The pipe works of Spang, Chalfant & Co. are running double time.

The Liberty Oil Refinery was totally destroyed by fire, caused by lightning, on Sunday morning. The Crescent Steel Works, of Miller, Metcalf & Parkin, just across from the refinery, were on fire a dozen times or more, but by the prompt action of the firemen the flames were extinguished each time with but trifling loss.

MARYLAND.

The Baltimore Iron Company have ordered suspended pipe hot-blast stoves from F. L. Weiner, Lebanon, Pa.

The merchant mill, at Cumberland, ran but two weeks, and is again idle.

There has been no change in the status of the furnaces in Maryland for the past three months. The demand just about equals the supply, but at prices which do not more than cover the cost of the iron.

OHIO.

We condense the following notes from the *Review* regarding Cleveland's industries: The Lake Erie Iron Company employ 120 men, and are running to full time on bar iron and forging. The Cleveland Iron Company are running their works pretty full, 500 hands, the usual number, being employed. J. H. Morley & Co., corrodors of lead, contemplate adding to their establishment two new corrodors, with a capacity of forty tons each. Last week the firm of Younglove, Brew & Co. was dissolved by the withdrawal of Mr. Brew, and the Cleveland Agricultural Works and Architectural Iron Works will hereafter be conducted by Messrs. Younglove & Co. Business with the Cleveland Rolling Mill Company continues fair. There are 2000 workmen employed at the vast works of the concern. The King Iron Bridge and Manufacturing Company employ 100 men at their shops in this city, and have a fair number of contracts. A bridge was recently shipped to Nevada, and the company have work in Vermont, Maine and other states at this time.

The Belfont Mill, Ironton, has been in operation five months out of the past six.

It is stated that the mill at Wellsville is to be started at once, under the management of Mr. Daker.

ILLINOIS.

At Joliet the old iron mill has resumed operations, making guide iron. The steel mill has been making 56 and 52 lb. rail.

MICHIGAN.

But one of the two charcoal furnaces of the Jackson Iron Company, located at Fayette, is in operation. It will continue in blast during the season.

WISCONSIN.

There are but two furnaces in blast in the State, viz., one Appleton and one National, both charcoal.

MISSOURI.

Of the coke furnaces of this State four are in blast—one Missouri and three Vulcan. Of the charcoal five are in blast.

AMERICAN SCREW CO.,

Providence, R. I.

Manufacturers of

IMPROVED
Gimlet Pointed Wood Screws,
Patented

May 30,

1876.

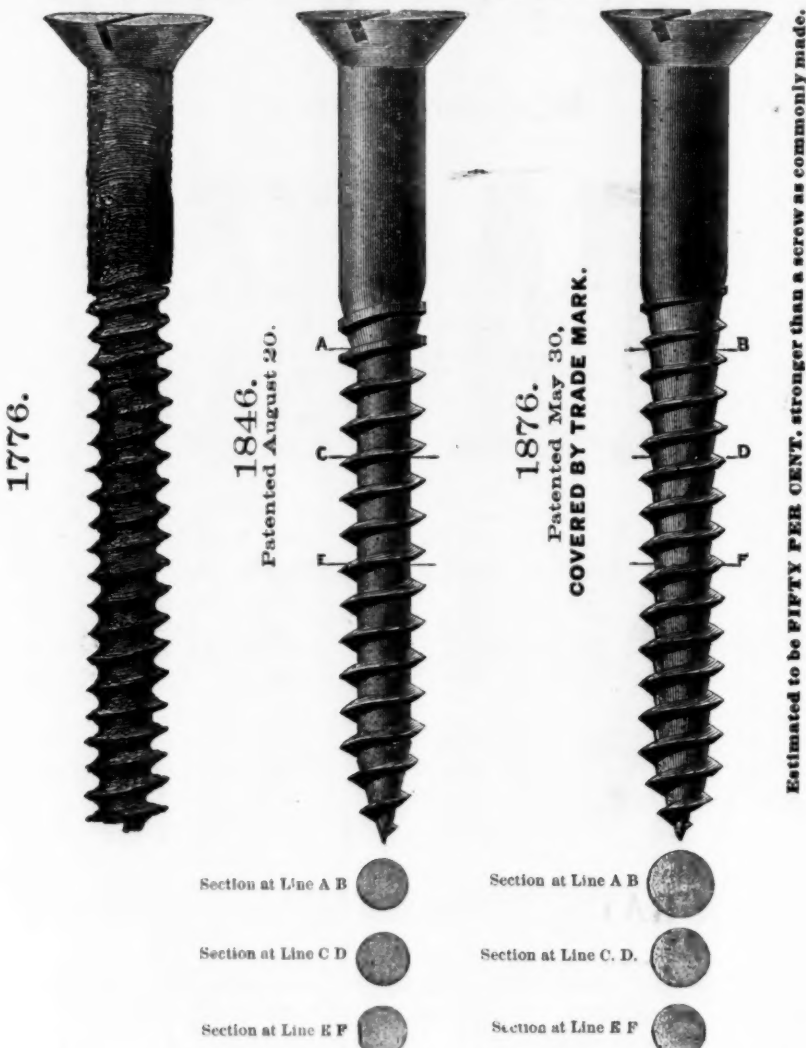


After forty years' experience we offer to the trade our Centennial Screw, patented May 30, 1876, as the best we have ever known.

The method of manufacturing is also patented, and we are changing our machinery as fast as possible, to manufacture the improved article only. To introduce them, they will be sold at same price as the old style screw.

The new screws will be packed in manila colored boxes with new label covering end of box, and enlarged figures showing plainly contents.

To distinguish this screw we have adopted a trade mark, which is also secured to us.



The above drawings show the progress of screw making from the old blunt point to style now adopted.

Experience has shown that the weak point of screws, as formerly made, is at the heel of the thread, where all the strains of forcing the screw into the wood naturally concentrate.

To avoid the sharp angle existing in the old style of screws has been the aim of all manufacturers, but every expedient hitherto adopted has proved as objectionable as the evil complained of.

It will be seen in our new screw that not only is the sharp angle avoided, but the strength very much increased, as illustrated above. See sections at lines.

CLAIM.

"A Pointed Wood Screw having the outer periphery of the thread upon its body cylindrical, while a portion of the body below the thread and near the neck is conical, the remainder of the body to the point being cylindrical, and yet having all the thread brought to an edge of a constant angle, without jogs in the paths between the threads, substantially as described."

Heating Steel for Forging.

As much trouble and loss are caused by improper heating in the forge fire as in the tempering fire, although steel may be heated safely very hot for forging if it be done properly, but any high degree of heat, no matter how uniform it may be, is unsafe for hardening.

The trouble in the forge fire is usually uneven heat, and not too high heat. Suppose the piece to be forged has been put into a very hot fire, and forced as quickly as possible to a high yellow heat, so that it is almost up to the scintillating point. If this be done, in a few minutes the outside will be quite soft and in nice condition for forging, while the middle parts will be not more than red hot. The highly heated soft outside will have very little tenacity—that is to say, this part will be so far advanced toward fusion that the particles will slide easily over one another, while the less highly heated inside parts will be hard, possessed of high tenacity, and the particles will not slide so easily over one another.



Fig. 1.

Now let the piece be placed under the hammer and forged, and the result will be as shown in Fig. 1.

The soft outside will yield so much more readily than the hard inside, that the outer particles will be torn asunder, while the inside will remain sound, and the piece will be pitched out and branded "burnt."

Suppose the case to be reversed and the inside to be much hotter than the outside—that is, that the inside shall be in a state of semi-fusion, while the outside is hard and firm.



Fig. 2.

Now let the piece be forged and we shall have the case as shown in Fig. 2. The outside will be all sound and the whole piece will appear perfectly good until it is cropped, and then it is found to be hollow inside, and it is pitched out and branded "burst."

In either case, if the piece had been heated soft all through, or if it had only been red hot all through, it would have forged perfectly sound and good.

If it be asked, Why then is there ever any necessity for smiths to use a low heat in forging, when a uniform high heat will do as well? we answer:

In some cases a high heat is more desirable to save heavy labor, but in every case where a fine steel is to be used for cutting purposes, it must be borne in mind that very heavy forging refines the bars as they slowly cool, and if the smith heats such refined bars until they are soft, he raises the grain, makes them coarse, and he cannot get them fine again unless he has a very heavy steam hammer at command and knows how to use it well.

In following the above hints there is a still greater danger to be avoided, that is incurred by letting the steel lie in the fire after it is properly heated. When the steel is hot through it should be taken from the fire immediately, and forged as quickly as possible.

"Soaking" in the fire causes steel to become "dry" and brittle, and does it more injury than any bad practice known to the most experienced.

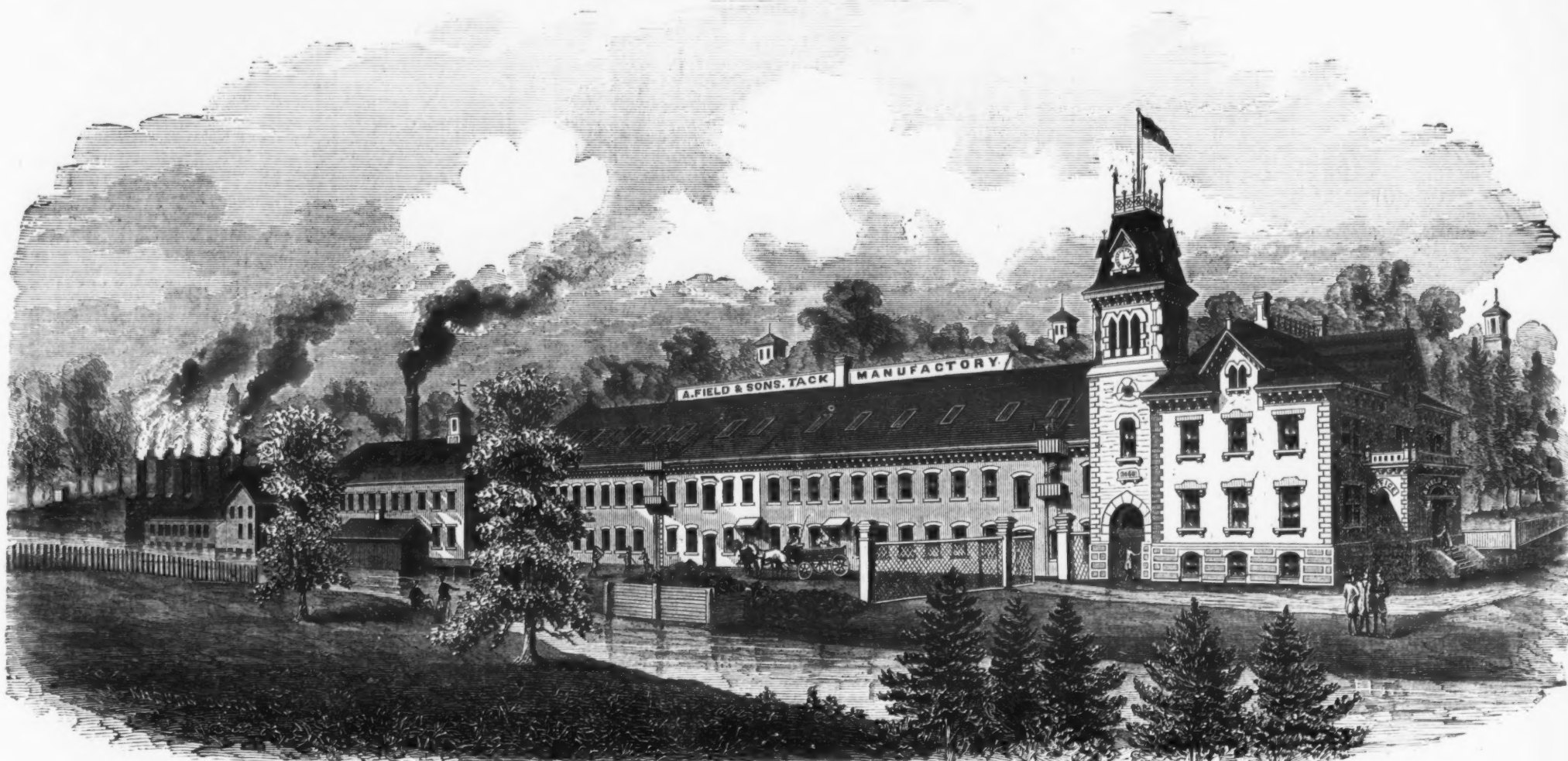
Respectfully,
MILLER, METCALF & PARKIN.
Pittsburgh, July 2, 1877.

The Empress of Russia's train, fitted for sanitary purposes, has carriages of the American type with a walk from end to end. At each side is a double row of beds with spring supports to ease joltings. The subsidaries are a mattress on elastic frame, two pillows, a cloth below, and a counterpane. Should the invalid's head require to be raised there is an appliance for that purpose; if he can use his hands a movable shelf for the articles he may need is at his disposal. There are sixteen beds in each carriage. Attached to the train is a cooking carriage, a provision room and two doctor's store rooms, with linen, lint, bandages, &c., and in each compartment are lavatories, &c. There are carriages for the nurses, &c., and in some, instead of beds, are chairs, which can be converted into beds or sofas. The emperor, empress, and court inspected the train before it left the camp, and took part in the vocal service of prayer by which the event was accompanied.

A board of naval constructors and engineers, Rear Admiral Mullaney, president, appointed to consider the advisability of completing the iron-clads at Roach's shipyard, has recently been in session at Chester. It is expected that it will recommend to the Navy Department the speedy completion of the monitors at the yard in all the details, and will also recommend the erection of a suitable mill for the fabrication of heavy armor plates of from 10 to 18 tons each, we at present being entirely dependent upon the English manufacturers for this class of material. A mill to furnish plate iron for armored vessels is required, but the necessary outlay of capital would hardly be justified unless encouraged by the general government. In the event of receiving this encouragement, Mr. Roach proposes to erect a large mill at his yard at Chester, or enlarge the rolling mill at South Chester.—*Philadelphia Press*.

The Harlan & Hollingsworth Company, of Wilmington, Del., are busy in their car department with South American orders. These include seven narrow-gauge passenger cars for the Campos and Carangola Railway, of Brazil. Three of them are a combination of first and second-class accommodations, the two compartments being separated by a central partition. In addition to the above, there are ten passenger cars of wider gauge in process of construction for the Dom Pedro II Railway.

ESTABLISHED 1827.



ENTIRE LENGTH OF WORKS 700 FEET.

A. FIELD & SONS

TAUNTON, MASS.

Manufacturers of

IRON
COPPER
TINNED
SWEDES IRON
UPHOLSTERERS'
CARD CLOTHING
PAIL AND TUB
GIMP
LACE
PATENT COPPER PLATED
LARGE HEAD CARPET

FINISHING
TRUNK
CLOUT
CHAIR
CIGAR BOX
HUNGARIAN
HOB
SILVERED OR JAPANNED LINING
SILVERED OR JAPANNED SADDLE
TUFTING
COPPER CUT

TACKS

NAILS

BRADS AND PATENT BRADS.

LEATHERED CARPET
TINNED CARPET
COLORED COATED CARPET
COFFIN LINING
MINERS'
BRUSH
LOOKING GLASS
SHOE OR LASTING
ROUND HEAD
ROOFING
EVERY STYLE OF

BOAT REGULAR
BOAT CHISEL POINTED
FINE TWO PENNY
FINE THREE PENNY
PATENT COPPER PLATED
CHANNEL
AMERICAN IRON SHOE
SWEDES IRON SHOE
ZINC SHOE
STEEL SHOE
CHARCOAL IRON SHOE

With New, Improved, and Patented Machinery. we shall now make

GLAZIERS' POINTS,

ONE OF OUR SPECIALTIES.

Any variation from the regular size or shape of the above named goods made from samples to order.

QUALITY GUARANTEED TO BE SATISFACTORY.

OFFICES AND FACTORIES. - - - - - TAUNTON, MASS.

Warehouse and Salesroom at 78 Chambers Street, New York.

Trade Report.

Office of The Iron Age,
TUESDAY EVENING, July 3, 1877.

The past week has been without feature of general interest in Wall street, and the dullness usual at this season is supplemented by the lack of speculative interest in the street. The money market continues very easy for those who have acceptable collaterals. The rate on call loans is 1 to 2 per cent. The discount rate on prime business paper is 3 to 5 per cent.

The gold market is without important feature. The following table shows the daily range of the premium:

	Highest.	Lowest.
Thursday.....	105 1/4	105 1/4
Friday.....	105 1/4	105 1/4
Saturday.....	105 1/4	105 1/4
Sunday.....	105 1/4	105 1/4
Tuesday.....	105 1/4	105 1/4

Government bonds are strong, with the exception of the new 5's and 5-20's of 1865. Thus far the subscriptions to the new 4 per cent. are somewhat in excess of \$8,000,000, and it is believed a total of \$25,000,000 will be reached before the books are closed for the popular subscription. We give below the closing quotations of the bond market.

The stock market is without feature calling for special notice. To-day showed a decided improvement over yesterday, however, and by noon the general list had advanced 1/2 to 3/4 per cent. This advance was not maintained in all cases, and toward the close the market manifested a tendency to weakness.

The last bank statement was somewhat more favorable than was expected, there having been an increase in the legal tender reserve of \$2,103,900, and in the gold average of \$1,244,000, the two increasing the total reserve \$3,347,900, and the surplus reserve \$2,554,875, the latter now standing at \$2,190,450. The following is a comparison of the averages for the past two weeks:

	June 23.	June 30.	Differences.
Loans.....	\$29,116,500	\$21,555,600	Inc. \$7,560,900
Specie.....	16,209,000	17,453,000	Inc. \$1,244,000
Legal tenders.....	8,255,600	10,203,900	Inc. \$1,948,300
Deposits.....	223,316,100	226,488,200	Inc. \$3,172,100
Circulation.....	15,705,600	15,043,200	Dec. \$662,400

As we go to press one day earlier this week than usual, owing to the interruption of the national holiday, we are unable to give the usual tables showing the foreign trade movements for the week.

Government bonds at the close were quoted as follows, with the tone of the market strong:

	Bid.	Asked.
U. S. Currency 6's.....	112 1/2	113 1/2
U. S. 6's 1881 registered.....	112 1/2	113 1/2
U. S. 6's 1881 coupon.....	112 1/2	113 1/2
U. S. 6's 1885 new reg.....	106 1/2	107 1/2
U. S. 6's 1885 reg.....	106 1/2	107 1/2
U. S. 6's 1886 reg.....	106 1/2	107 1/2
U. S. 6's 1886 coupon.....	106 1/2	107 1/2
U. S. 6's 1888 reg.....	112 1/2	113 1/2
U. S. 6's 1888 coupon.....	112 1/2	113 1/2
U. S. 10-40 reg.....	112 1/2	113 1/2
U. S. 10-40 coupon.....	112 1/2	113 1/2
U. S. 5's 1881 registered.....	112 1/2	113 1/2
U. S. 5's 1881 coupon.....	112 1/2	113 1/2
U. S. 4 1/2's 1891 registered.....	108 1/2	109 1/2
U. S. 4 1/2's 1891 coupon.....	108 1/2	109 1/2

The following are the closing quotations of active shares:

	Bid.	Asked.
Atlantic and Pacific Telegraph.....	20 1/2	21 1/2
Chicago and Northwest.....	20 1/2	21 1/2
Chicago, Rock Island and Pacific.....	45 1/2	46 1/2
Chicago, Bar and Quincy.....	91 1/2	92 1/2
Clev. C. C. and Quincy.....	91 1/2	92 1/2
Cleveland and Pittsburgh.....	23 1/2	24 1/2
Chicago and Alton.....	77 1/2	78 1/2
Delaware, Lack and Western.....	101 1/2	102 1/2
Delaware and Hudson Canal.....	37 1/2	38 1/2
Express-Adams.....	35 1/2	36 1/2
American.....	95 1/2	96 1/2
United States.....	42 1/2	43 1/2
Wells, Fargo & Co.....	84 1/2	85 1/2
Erie.....	6 1/2	6 3/4
Harlem.....	13 1/2	14 1/2
Hannibal and St. Joseph.....	15 1/2	16 1/2
Illinois Central.....	32 1/2	33 1/2
Lake Shore.....	53 1/2	54 1/2
Michigan Central.....	48 1/2	49 1/2
Morris and Essex.....	66 1/2	67 1/2
Milwaukee and St. Paul.....	10 1/2	11 1/2
New York Central.....	51 1/2	52 1/2
New Jersey Central.....	7 1/2	8 1/2
Ohio and Mississippi.....	2 1/2	3 1/2
Pacific Mail.....	4 1/2	5 1/2
Pittsburgh and Fort Wayne.....	10 1/2	11 1/2
Quicksilver.....	14 1/2	15 1/2
St. Louis Kansas City Northern.....	2 1/2	3 1/2
Toledo, Washab and Western.....	2 1/2	3 1/2
Union Pacific.....	65 1/2	66 1/2
Western Union Telegraph.....	58 1/2	59 1/2

MINING STOCKS.

Mr. Ogden Haight, No. 16 New street, sends us the following report of the business of the New York Mining Stock Exchange for the week ending July 4:

	COPPER STOCKS.	Bid.	Offered.	Sales.
Allouez Mining Co.....	\$2.00	\$2.00		
Atlantic Calumet & Hecla Min. Co.....	6.75	7.25	3.60	
Central Franklin.....	38.50	40.50	70	
Madison.....	4.00	5.00		
Minnesota.....	1.00	1.00		
Monard (ass't paid.).....	25	35	900	
National.....	1.00	2.00		
Oscoda.....	1.00	2.00		
Pewabic.....	1.00	2.00		
Quincy.....	33.50	35.00		
Ridge.....	2.00	3.50		
Rockland.....	2.00	3.50		

GOLD STOCKS.

	Bid.	Offered.	Sales.
Am. Flag G. M. Co., Col.....	.07	.09	700
Bobtail.....	1.00	1.50	2,600
Lacrosse.....	.30	.35	7,300
N. Y. & Col.....	1.25	2.50	
Seaton Consolidated.....	20.25	20.50	
Ontario Silver Min. Co.....	11.00	13.00	
Alpha, Nev. Gold & Silver.....	5.00	7.00	
Belcher.....	20.00	25.00	
Best & Belcher.....	33.00	35.00	
Caladonia.....	1.00	1.50	
Crown Point.....	4.00	5.00	
Eureka, G. V., ex div.....	1.00	2.00	
Exchequer.....	5.00	6.00	
Gould & Curry.....	5.00	6.00	
Hale & Norcross.....	5.00	6.00	
Julia.....	2.00	3.00	
Justice.....	7.50	10.00	
Kentuck.....	4.00	5.00	
Mexican.....	15.00	17.00	
Overman.....	10.00	12.00	
Raymond & Ely.....	10.00	12.00	
Ophir.....	8.00	10.00	
Sage.....	20.00	25.00	
Santa Fe.....	5.00	6.00	
Silver Hill.....	2.00	3.00	

* No sales July 4.

Union Con. Gold and Silver..... 6.00 7.00
Yellow Jacket..... 12.00 14.00

LEAD STOCKS.
St. Joseph Lead Co..... 5.00 4.00

SILVER STOCKS.
Silver Inlet Mining Co..... 25 3.00 4.00

TUNNEL COMPANIES.
Bobtail Tunnel..... 3.00 4.00

MISCELLANEOUS STOCKS.
Smith & Parnell..... 12 1.00 2.00
Hukill, of Col..... 12 1.00 2.00
United Petroleum Farms..... 25 1.00 2.00

The stock of the Rescue Mining Company, of Silverado, Nevada, has been admitted to the list of the exchange during the past week. This company is incorporated under the laws of New York, with a capital of \$1,000,000, divided into 100,000 shares of \$10 each. Its mine is located on Silverado Mountain, Eureka county, Nevada, 85 miles from Palisade Station, on the Central Pacific Railroad. It is 1500 feet long by 600 feet broad, containing 20.66 acres, and has been opened up to a depth of 265 feet by an inclined shaft with levels and winzes. About 3000 tons of ore have been extracted, 1000 tons of which were sold, realizing \$265,000. The remaining 2000 tons now on the dumps will average from \$60 to \$70 per ton. The first-class ores will yield from 50 to 60 per cent. of lead, and are readily salable to one or the other of the numerous smelting works in the town of Eureka, a place of 5000 inhabitants, where are located such companies as the Richmond, Eureka Consolidated, K. K. Consolidated, etc., in some of which English capital is largely interested. The company has over \$300,000 worth of real and personal property, including ores, etc., and expect to produce annually some \$250,000. This estimate is based upon ore now in sight and upon work already done. With the exception of its own State, and the states of Colorado, Utah and California, the Eureka district has been unsurpassed in production of precious metals, its yield for 1876 having been \$4,003,147.75.

GENERAL HARDWARE.

A great deal of interest is manifested in the trade regarding the new prices of Locks. Some of the makers have already placed their lists in the hands of their customers. We print below the revised prices of the Russell & Erwin Mfg. Co., Mallory, Wheeler & Co., and the Norwich Lock Mfg. Co. The low price of Flat Head Iron Wood Screws is also a subject of considerable comment, and will doubtless have a stimulating effect on buyers. These goods are now offered at lower prices than ever before. The Russell & Erwin Manufacturing Co. have issued the following circular, under date of 2d instant:

Circular No. 7.

SCREWS.

We hereby annul our circular on Screws dated June 21, 1877. Until further notice, we solicit orders for Flat Head Bright Iron Screws upon the following terms:

Discount 70 per cent. from our list, cash thirty days. No prices guaranteed. All orders received will be promptly filled from our stock so far as possible, and balances executed at our ruling rates at date of shipment. We also solicit orders for Round Head Iron, and Flat and Round Head Brass, Bronze and Plated Screws, all of our own manufacture.

RUSSELL & ERWIN MFG. CO.

New York, July 2, 1877.

We are advised the American Screw Company do not anticipate making any change in their discounts.

The tone of the Nail market is, we think, stronger than when our last report was written. During the week orders for large lots at current quotations have been declined, and there is no disposition to force sales at ruling rates. We quote as before, rod, nominally, \$2.40.

At the meeting of the Tack Manufacturers' Association, mention of which was made in our last issue, the existing prices and terms were confirmed for the ensuing season.

The Tinware Manufacturers' Association, as our readers are aware, held a meeting in this city on Wednesday last. The attendance was large, and the meeting, we are informed, was very harmonious. Owing to the low prices at present prevailing in the metal market, the prices of Common and Deep Stamped Ware were reduced. The regular discount off Common Stamped Ware established by the Association is 25 per cent., and off Deep Stamped Ware, 37 1/2 per cent.

Heaton & Denckla, Philadelphia, have issued the following revised price list for France's Shutter Holder, which is subject to discount 10 per cent:

France's Shutter Holder.

	Japanned.	Galvanized.
6 inch..... per doz., \$1.00	1.00	1.00
8 inch..... per doz., \$1.50	1.50	1.50
10 inch..... per doz., \$2.00	2.00	2.00
12 inch..... per doz., \$2.50	2.50	2.50
14 inch..... per doz., \$3.00	3.00	3.00
16 inch..... per doz., \$3.50	3.50	3.50

The announcement that the old house of J. Clark Wilson & Co. is financially embarrassed, was a surprise to the trade here, and will be read with regret by their large connection. The following is the announcement referred to:

New York, June 30, 1877.

TO OUR CREDITORS: We regret to inform you that in consequence of the heavy losses we have sustained, the great decline in our trade and the shrinkage of values during the past year, we have been compelled to suspend payment.

We have a large number of commission sales accounts, and until we can ascertain the amount due on them to date we cannot tell what settlement we can offer.

We shall endeavor to present you a statement of our affairs in as short a time as possible.

Yours, truly,

J. CLARK WILSON & CO.,

St. Beekman street.

We are informed that Henry Diston & Sons File Co. (limited), and the American File Co. have adopted the list now used by the Nicholson's and Western File companies, subject to discount 30 per cent.

The Henry Diston & Sons File Co. show in their advertisement on the 16th and 17th pages a variety of their Files and Rasps, and in addition eighteen sections of Files, showing in a very intelligible manner the different cuts of Files and Rasps and their technical names.

* With Nickel-plated Patent Steel Key.

THE IRON AGG.

The Stanley Rule and Level Co. have issued their revised discount sheet under date of 2d inst. The only changes since their last discount sheet was issued, are on Rules, the new prices for which have already been noticed in these columns.

P. & F. Corbin will soon issue to the trade their revised list of Locks, Latches, &c., changing the discount to 40 and 50 per cent., the effect of which will be a reduction on most of the line from former rates, particularly on the higher priced goods. Their revised list of miscellaneous goods, which will be ready for distribution within a few days, will contain some changes. They have issued the following notice:

Having enlarged our facilities at our factory for storing and shipping goods, we shall from and after this date forward all heavy shipments direct from our works at New Britain.

Express orders from the West and South can be filled from our New York warehouse, where we shall continue to keep a general stock of our goods as heretofore.

To prevent delay in future the trade are requested to send orders direct to the factory.

P. & F. CORBIN.
New Britain, Conn.; New York city, July 2, 1877.

The following are the Russell & Erwin Mfg. Co.'s revised prices and discounts of Hardware and description of new goods, issued under date of 2d instant, and to be attached to vol. 4, catalogue of 1877. Their terms are: "Cash, subject to draft, at sight, after 30 days. A discount of 2 per cent. will be allowed if paid within 30 days. All orders subject to our ruling rates at date of shipment. No prices guaranteed. Goods in transit at risk of purchaser."

Among the new goods presented by them are a line of cheap Locks, including Upright Rim, Horizontal Rim, Mortise Knob and Rim and Mortise Latches, all made to pull out reverse. They also present a line of Upright and Horizontal Rim Knob Locks and Mortise Locks made with their Patent Steel Nickel-plated Keys, which are offered at lower prices than these goods have ever been sold for before. Their price for Patent Steel Keys is greatly reduced.

RUSSELL & ERWIN MANUFACTURING CO.'S REVISED PRICES AND DISCOUNTS.

Locks and Latches in Numerical Order.

No. of Lock.	Page of Price List.	Per doz.
1000	10	11.50
1001	10	13.75

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* With Nickel-plated Patent Steel Key.

No. of Lock.	Page of Price List.	Per doz.	No. of Lock.	Page of Price List.	Per doz.
322	57	\$7.00	713 1/2, a keys	59	33
323	57	20.25	718	59	40.00
324	57	22.75	718 1/2, a keys.	59	43.50
329	53	8.25	778	72	60.00
341	53	8.25	778	84	25.00
343	53	16.50	778 1/2, a keys.	84	25.00
344	53	10.00	781	84	7.50
330	53	8.00	790 1/2	80	60.00
331	53	9.50	790 1/2	80	80.00
353	53	18.25	791	87	90.00
354	53	20.75	791	87	90.00
355	52	23.00	801	5	5.00
356	52	8.00	801	4	5.25
361	52	9.75	801 1/2	5	7.75
361	52	10.00	801 1/2	5	7.75
363	52	13.75	808	5	11.25
364	52	15.00	808	5	15.00
365	52	19.50	808	5	19.00
370	52	9.75	807	5	11.25
371	52	12.25	810	0	21.50
372	52	15.50	811	6	38.00
373	52	18.00	811	6	37.50
374	52	21.25	813	5	10.00
375	52	13.75	820	5	15.00
376	52	17.00	821	5	12.00
377	52	20.25	822	5	14.25
378	52	23.75	823	7	22.75
379	33	49.00	826	7	25.25
380	33	55.00	827	7	35.00
381	33	72.00	830	7	36.00
382	38	26.50	832	7	39.75
383	38	27.00	832	7	39.75
384	38	32.00	833	7	39.75
385	38	32.00	840 1/2	New	3.65
386	38	32.00	840 1/2	New	3.65
387	50	20.00	850 1/2	2	4.00
388	50	16.00	851	2	4.75
389	48	55.00	851 1/2	2	6.75
390	48	32.00	855	2	7.00
391	48	32.00	855	2	7.00
392	48	32.00	860	2	9.00
393	48	33.00	860	2	9.25
394	48	32.00	860 1/2	4	4.50
395	48	38.00	861	4	4.75
396	48	40.00	861 1/2	4	6.75
397	48	40.00	861 1/2	4	7.00
398	49	34.50	862 1/2	4	10.25
399	49	37.00	865	4	10.50
400	49	75.00	866	4 1/2	9.50
401	49	75.00	870	3	5.25
402	10	6.00	870	3	5.25
403	10	8.25	872	3	7.50
404	10	8.25	879	3	11.00
405	10	10.50	1200	29	48.00
406	11	15.00	1201	New	8.00
407	10	11.75	1201 1/2	New	8.00

tion Coal are obliged to make smaller margins, and thus their quotations are adhered to, but among agents and the companies and the trade generally concessions can be had pretty easily, although they are often small.

IMPORTS

Of Hardware, Iron, Steel and Metals into the Port of New York, for the Week ending July 3, 1877:

Hardware.	
Baker Hermann & Co.	Bars, 2538.
Packages, 8.	Bundles, 232.
Mds., pkgs., 12.	Sheet, bbls., 317.
Crossman W. H. & Bros.	Froster Thos. & Son
Mds., pkgs., 6.	Packages, 4.
Curley J. & Bro.	Ortiz, H. & Co.
Cutlery, cs., 1.	Pig, tons, 100.
Degraw Aymer & Co.	Bars, 408.
Chains, cks., 4.	Sheet, bbls., 55.
Lengths, 2.	
Fuller Bros.	
Cutlery, cks., 2.	
Fisher J. L.	
Cases, 2.	
Hammars & Co.	
Packages, 1.	
Langland & Co.	
Wire, bbls., 108.	
Wire Rols, 59.	
McCoy & Co.	
Mds., pkgs., 3.	
Moore J. P. & Sons.	
Cartridge cases, 87.	
Gun caps, cs., 5.	
Moore Henry	
Files, cks., 4.	
Noyes Smith & Co.	
Gun caps, cs., 4.	
Sanderson Geo.	
Scales, cks., 1.	
Wire Rols, 59.	
Schoverling & Daly	
Cases, 2.	
Guns, cs., 2.	
Sondheim B. & Co.	
Cases, 2.	
Van Cleef & Co.	
Ironware, cks., 9.	
Ward Asline	
Mds., pkgs., 10.	
Wiebusch & Hilger	
Hdw. Co.	
Mds., pkgs., 21.	
Ironware, cs., 7.	
Order.	
Anvils, 4.	
Cases, 4.	
Wire, bbls., 3.	
Wire, cks., 1.	
Guns, cs., 2.	
Wire coils, 997.	
Iron.	
Brown Bros. & Co.	
Rols, coils, 272.	
Hopkins E. T.	
Pig, tons, 250.	
Hinges, lots, 1.	
Henderson Bros.	
Pig, tons, 200.	
Naylor & Co.	
Barrels, 144.	

OLD METALS, PAPER STOCK, &c.

We have no perceptible change to report in the condition of the Old Metal market. Business is still very quiet, and quotations remain nominally unchanged. Copper, Brass, Composition and Lead are all in a weak condition, and the prospect of lower rates deters many from buying. Iron is a trifle better, though the improvement is slight. There is not a very large supply in dealers' hands, though it is in excess of the demand. Paper Stock and Rags still continue unchanged from the dullness previously reported. We quote the following as the current purchasing rates:

Old Metals.—Copper, 14c. to 15c. per lb.; Yellow Metal, 10c.; Brass, 5c.; Composition, heavy, 12c.; Lead, solid, 4c.; Tea Lead, 4c.; Zinc, 3c.; Pewter, No. 1, 13c.; do, No. 2, 8c.; Spelter, 5c.; Wrought Iron, 18c. per ton; Light, do, 10c. per ton; Stove Plate, 9c. per ton; Machinery, do, 12c. per ton; Burned Iron, 8c. per ton.

Rags, &c.—Canvas, Linen, 4c. to 5c.; do, Cotton, No. 1, 5c.; No. 2, 4c.; White, No. 1, 4c.; No. 2, 3c.; Colored, do, 2c.; Mixed, Woolen, 2c. to 3c.; Soft, do, 5c. to 6c.; Gunny Bagging, 1c.; Jute Butts, 1c. to 2c.; Kentucky Bagging, 3c.; Book Stock, 2c.; Newspaper Stock, 2c.; Waste Paper and Scraps, 1c.; Kentucky Bale Rope, 4c.; Oakum Junk, No. 1, 4c. to 5c.; do, No. 2, 3c.; Tarred Shaking, 1c. to 1c.; Grass Rope, 3c. to 3c.

PHILADELPHIA.

Office of The Iron Age, 230 South Fourth St., Philadelphia, July 2, 1877.

In looking over the first half of the year now past, and comparing results with anticipations, it is not surprising there is a very general feeling of disappointment. There is reason to think, however, that the last half of the year will be better than the first, although a general improvement may not be seen until toward the close of the year. We cannot advance any new theory, but the old one seems to have gathered new force. The policy of economy so generally practiced of late, and the "hand-to-mouth-and-pay-as-you-go" system "has no doubt brought business to a more healthy condition than when large stocks were carried on long credits. With the assurance of a wise and honorable policy at Washington, there is nothing in the political aspect of things to interfere with business, but the reverse. The prospects of abundant crops and remunerative prices may reasonably be expected to stimulate trade in every direction. Confidence is about the only thing necessary to produce a gradual improvement, and under such favorable conditions as above noted, it is reasonable to suppose that this will soon begin to show itself, and ere long be firmly established.

Pig Iron.—The course of the market from the beginning of the year has been steadily downward, and about equal to the decline during the whole of 1876. The opening sales of No. 1 Foundry the first week of 1877 were at \$21, and while \$18.50 may now be considered an average price, \$18 is understood to be the figure for round lots, prompt cash. The market is still weak, with nothing to indicate approaching firmness in the immediate future, although the downward tendency must of necessity soon be arrested. For the past year or two the cost of production has had but little influence on the market price, as sellers have been compelled to take what they could get regardless of cost. The selling price, however, has had a considerable influence in forcing a reduction in the cost of production, until at last it appears to have reached the lowest possible point attainable. From an article which appears on another page, it will be seen that the average cost of Pig Iron on furnace bank is now estimated at \$18.36 per ton, which

at present market prices is about \$2 per ton more than the average selling price. If these figures are correct (and there is no reason to doubt them) the trade must have reached a condition which can only be of very temporary duration. Solvent concerns will not continue business on such terms for any great length of time, and others cannot. It is not probable, however, that any advance in prices can be obtained until confidence is restored. So long as there are anxious sellers, and only timid buyers, it is hopeless to expect any improvement in that respect. So far as Pig Iron is concerned it does seem therefore as though bottom has been reached, and although there is nothing upon which to base any expectations of immediate improvement, neither is there any reason to suppose prices can decline further unless very temporarily. Indications point to a larger business, but without any material change in values, which at present may be quoted \$18 to \$19 for No. 1 Foundry; \$17 to \$17.50 for No. 2, and \$16.50 to \$17 for Gray Forge.

Manufactured Iron.—We continue to have evidences of improvement in some directions, and, although the actual increase of business is not likely to be very marked for a couple of months to come, the future looks quite encouraging. Some very important interests, such as shipbuilding, bridge building, car building, &c., show a degree of activity that is likely soon to be felt in other departments. Work upon two large iron vessels for the South American trade will be commenced within a few days, making a total of five ordered within the past two weeks, the same firm (Roach & Son) now having contracts on hand for ten large steamships. The Plate mills are receiving a very fair amount of business, but, as we have frequently had to remark, prices are said to be too low to leave any margin for profit. There is no improvement whatever in that respect, and the market is probably weaker to-day than at any time during the year. In Sheet Iron the demand seems to have dropped off entirely, and all, or nearly all, the mills will shut down for a month or more in the hope of working down stocks, and also reducing prices of labor. A member of one of the oldest firms in the country informs us that after examining their books as far back as 1842 he found that prices were much lower to-day than at any time since that date, with absolutely no demand at present. The Bar trade appears to be looking up a little, particularly for the higher qualities, and although prices are low and unremunerative, there appears to be a disposition among buyers to look more for a better quality than for lower prices. From our quotations it will be seen that Bars can be bought at almost any price, but the best quality cannot be had below quotations, although at a lower cost the article may possibly be good in proportion.

We quote Bars, Common, 1.65c. to 1.75c.; Best Refined, 2c. to 2.1c.; Ship Plates, 2.37c. to 2.50c.; Tank Iron, 2c. to 2.2c.; Shell Iron, 3c.; Flange Iron, 4c. to 4.4c.; and Best Bloom, 6c. to 6.4c.

Sheet.—Common American, No. 6 to 17, 2c. to 3c.; No. 18 to 28, 3c. to 3.4c.; Best Best Charcoal Bloom, No. 6 to 20, 5c.; No. 22 to 28, 5c. to 6c.; Philadelphia Russia, 8c.

Rails.—Prices of Steel Rails have been very uniform for months past. The opening price in 1877 was nominally \$50, cash, at mills, but prices soon weakened under a reported sale at \$47.50 at Baltimore—estimated to be equivalent to \$45 at mills. There were, however, special circumstances in favor of the seller, which made the transaction a more favorable one than prices would seem to indicate. Since that time \$47 to \$48 has been the usual price for small lots, and down as low as \$46 for large lots, prompt cash, at which price the market at present may be considered quiet and steady. The mills have still a moderate amount of business on hand, but for some time past the output has been considerably in excess of orders. Under these circumstances there is an increasing anxiety to secure business, and it is not unlikely that some concessions would be made to cash buyers for large lots. Prices, however, are already about down to cost of production, and, as it seems impossible to cheapen cost, it is not likely there will be any general break in prices. The next thirty days will doubtless determine the course of the trade, but, in the meantime, there appears to be no prospect of an advance, and, as we said before, it will be impossible to sell at lower rates without doing so at a positive loss. Inquiries are numerous, and unless there is a further decrease in orders, the mills will have some contracts on hand, and small orders dropping in from time to time are not likely to have to stop for want of business. It is tolerably certain, however, that if any one concern cuts under to an important extent others will follow, and the ultimate result be a lower range of prices, without any increase of business.

Iron Rails.—Have varied very little (brought down to a cash basis), and at the present time prospects seem to indicate a larger business. The difficulty has been not so much a scarcity of buyers as the difficulty of financing. Sellers have become very cautious, and if they do not get actual cash, they insist upon absolute security. Present quotations are \$33 to \$36, cash, at mills, according to quality and terms.

PITTSBURGH.

Office of The Iron Age, 77 Fourth Avenue, Pittsburgh, July 2, 1877.

Pig Iron.—There has been but little change in the situation during the past week. Business continues just about as dull as it can be without ceasing altogether, and there is no apparent prospect of any immediate change for the better. In addition to the fact that the demand is nearly always very much restricted at this season of the year, Old Rails have largely taken the place of Pig Iron in consequence of their being so much cheaper. It is estimated that the consumption of the former at the present time is almost equal to the latter; hence, Pig Iron is weak and a shade lower, as compared with a month ago. However, holders of good brands of Pig Iron are not disposed to make any further concessions, and the feeling prevails that hard pan has been reached, and sellers, in view of this, are not making much effort to sell. Bituminous Coal Smelted Irons are

quotable as follows: No. 1 Foundry, \$23, 4 months; No. 2 do., \$22; Gray Forge, \$21 to \$21.50 for red short.

Manufactured Iron.—There is no improvement to report in the demand; business continues distressingly dull, and no immediate change for the better is expected. A number of the mills will shut down this month to take stock and make repairs, and if they would all stop for sixty days, and thereby keep down stocks, makers would have some chance of obtaining living prices this fall. In view of the fact that there is every prospect of big crops all through the country, an increased consumption this fall and winter is confidently expected; but unless there is an improvement in prices, manufacturers will be no better off, as in the present condition of affairs the more they sell the less money they have, as prices are down as low now as ever known in the history of the business. Bars are still quoted at 1.65c. to 1.75c., although we hear of sale as low as 1.60c.

Nails.—The market continues badly demoralized. In addition to a very light demand there is no uniformity of prices. Each firm is making its own price, but in view of the fact that current rates are down below the cost of production, makers are not soliciting orders; and while they are still selling small lots to regular customers, they are refusing to contract for future delivery at prevailing prices. Quotations may be given at \$2.25, with rumors of sales as low as \$2.15. It appears to be the determination of the trade to give those makers who were so ready to cut rates a benefit of low prices.

Horse and Muleshoes.—Continue very dull, with no immediate improvement expected this side of August. Business has been very dull all this year—unusually so. Prices nominally unchanged. Shoeborger & Co. still quote in 100 keg lots at \$3.80 and \$4.80.

Steel.—The demand for nearly all the leading grades and styles has fallen off very materially within the past few weeks, and manufacturers generally report business as being dull, although not any more so than usual at this season of the year. No quotable change in prices.

Wrought Pipe.—The demand continues fair and is improving as the season advances, but it is not up to what it should be at this season of the year. Manufacturers are hopeful that business will be better during the last half than it has been the first half of the year. The movement agitated for several weeks so vigorously with a view to shutting down for a given time, appears to have been abandoned for the present.

Scrap.—There is a very fair movement in Old Rails. The consumption has been increasing for some weeks, but the supply continues in excess of the demand, and prices are weak, but unchanged; \$20 to \$21, four months, per gross ton; Old Car Wheels quoted \$19 to \$21; Boiler Scrap, \$22 to \$24; Old Car Springs, \$37 to \$42; Stove Plate, \$10 to \$12.

Window Glass.—The demand continues light, as it usually is at this particular time, and no immediate improvement is expected. No change in card or discounts—70 per cent. by the car load, and 60 and 10 to 60 and 20 for smaller lots.

Coke.—Continues dull, although in view of the depressed condition of the Pig Iron trade business is, and has been all this year, better—all that can be reasonably expected. Prices nominally unchanged; \$2.25 to \$2.50 per ton delivered free on cars in Pittsburgh.

Petroleum.—All of our refineries continue busy, and it looks as if they were destined to have all they can do during the remainder of this year. The exports continue heavy, and the home trade demand will soon open up. Prices continue low and the margin for profit is small, but the most, if not all, of the Pittsburgh refiners are doing very well considering the depression in other branches of business.

BOSTON.

JUNE 29.—Pig is very dull, and prices still tend downward. We quote \$22.50 to \$23.50 for No. 1; \$21.50 to \$22 for No. 2, and \$21 to \$22 for Gray Forge. Scotch Pig is neglected, and prices are easier. We quote \$24 to \$24.50 for store lots. Bar is dull, quoting \$46 to \$47 for refined, and \$37 to \$38 for common. Nails are in light demand at unchanged prices. Sheet is selling at 3c. to 3.4c. per pound. Russia is quiet at 12c., currency. We quote English spring steel 7c. to 8c., gold; 9c. to 11c. for German; 9c. to 11c. for machinery; 1.4c. to 1.5c. for cast; 10c. to 12c. for blister; 8c. for American spring; 1.3c. to 1.4c. for cast; 9c. for blister, and 8c. for machinery. Copper has been steady and firm, with sales of 400,000 lbs. Lake at 19c., and 200,000 lbs. Baltimore at 19c., beside small lots of the former to arrive till August at 19c. London is quoted at 76 for best selected. For manufactured we quote: New Sheathing, 30c. to 31c.; Bolts and Braziers, 31c. to 31.4c.; Yellow Metal Bolts, 25c. to 25.4c.; do. Sheathing, 20c. to 20.4c. Lead is easy at the decline. We quote Pig, 5c. to 5.4c., currency, for Domestic; Sheet, 9c.; Pipe, 9c.; Tin Lined Pipe, 16c.; Bar Lead, 8c. to 9c., less usual trade or 10 per cent. discount. Antimony is firm at 12c. to 12.4c., gold, for Boston, spot lots, and Spelter is easy, closing at \$6.25 on the spot for 10 ton lots. Tin is flat under large prospective arrivals. We quote: Straits, 16c. to 16.4c.; Banca, 19c. to 19.4c.; Refined English, 16c. to 16.4c., gold. We quote plates: Charcoal, I. C., \$7 to \$7.50; Coke, \$6 to \$6.25, and Terne at \$6.75 to \$7.25, gold.—Commercial Bulletin.

LOUISVILLE.

Messrs. GEO. H. HULL & Co., under date of July 2d, write us as follows: No decided change in the market. Fair inquiry for consumption, but no quotable change in price. The usual time, 4 months, allowed on quotations below:

FOUNDRY IRONS.	
No. 1 Hanging Rock, Charcoal	\$24.00 @ 24.50
No. 2	21.00 @ 22.00
No. 3 Southern, Charcoal	21.00 @ 22.00
No. 4	20.00 @ 21.00
No. 1 Hanging Rock, Stonecoal and Coke	22.00 @ 23.00
No. 2 Hanging Rock, Stonecoal and Coke	20.00 @ 21.00
No. 3 Southern, Stonecoal and Coke	20.00 @ 21.00
No. 4	20.00 @ 21.00
"American Scotch"	22.50 @ 23.00
Silver Gray	19.00 @ 20.00

MILL IRONS.	
No. 1 Charcoal, Cold-short and Neut'l	19.00 @ 20.50
No. 2 Stonecoal and Coke, Cold-short and Neut'l	18.50 @ 20.00
No. 3 Stonecoal and Coke, Cold-short and Neut'l	18.50 @ 19.00
No. 4 Missouri and Indian Red-short	22.00 @ 23.00
White and Mottled, Cold-short and Neut'l	16.00 @ 17.00
CAR WHEELS AND MALLEABLE IRONS.	
Hanging Rock, Cold-blast	31.00 @ 32.00
Alabama and Georgia, Cold-blast	26.00 @ 27.00
Kentucky, Cold-blast	25.00 @ 26.00

ST. LOUIS.

Specially reported by Messrs. SPOONER & COLLINS, Iron commission merchants, 217 North Third street, St. Louis, under date of June 28: Our market is very dull and quiet, trade having fallen off considerably, as is usual at this season of the year. The prospects seem good now for a lively trade in the fall. We quote same as last:

No. 1. No. 2. Mill. White and	
Missouri Stone Coal	\$23.00 @ \$24.50
Missouri Charcoal	23.00 @ 23.00
Tennessee Charcoal	23.00 @ 23.00
Southern Coke, very soft and strong	25.00 @ 25.00
Hanging Rock Charcoal	26.00 @ 26.00
H. R. Charcoal, Cold-short	25.00 @ 24.00
Alice H. R. Coke	25.00 @ 25.00
Quinnimont, West Virginia, Coke	25.00 @ 25.00
COLD-BLAST CHARCOAL—All Numbers.	
Hanging Rock	\$25.00 @ 40.00—4 mos.
Tennessee	23.00 @ 30.00—4 mos.
Kentucky	23.00 @ 30.00—4 mos.
Missouri	23.00 @ 30.00—4 mos.
Georgia	23.00 @ 30.00—4 mos.
Alabama	23.00 @ 30.00—4 mos.
Assorted Bar Iron	25.00 @ 25.00 rates.
No. 1 Wrought Scrap	10.00 @
No. 1 Railroad	1.00 @
Machinery Cast	8.00 @
Light Cast	5.00 @
Old Rails	18.50 @ 19.50—4 mos.
Old Car Wheels	18.50 @ 19.50—4 mos.

CINCINNATI.

Messrs. L. R. HULL & Co., under date of June 30, write us as follows: The demand, we think, shows a very slight improvement, but cannot be called more than moderate. As this is the regular dull season, there is nothing particularly discouraging in the present absence of activity, and it is hoped trade generally will show an improvement after the marketing of this year's crops. Prices below are without material change:

HOT-BLAST FOUNDRY.	
Hanging Rock No. 1, Charcoal	24.00 @ 24.50—4 mos.
Hanging Rock No. 2, Charcoal	22.00 @ 22.50—4 mos.
"No. 1, Coke	23.00 @ 24.00—4 mos.
"No. 2	22.00 @ 23.00—4 mos.
coke	21.00 @ 22.00—4 mos.
Virginia, No. 1 Coke	24.00 @ 24.50—4 mos.
Ala. and Tenn., No. 1 Charcoal	23.00 @ 23.00—4 mos.
"No. 2	21.50 @ 22.50—4 mos.
Red-short, No. 1 Coke	23.00 @ 23.00—4 mos.
Fannie U. S. Scotch No. 1	23.00 @ 23.00—4 mos.
Alice	23.00 @ 23.00—4 mos.
Am. Scotch No. 1	21.00 @ 22.00—4 mos.
FORGE IRONS.	
Hanging Rock No. 1 Charcoal	24.00 @ 24.50—4 mos.
Hanging Rock No. 2 Coke	21.00 @ 21.00—4 mos.
Virginia, No. 1 Coke	20.00 @ 21.00—4 mos.
Ala. and Tenn., No. 1 Charcoal	20.00 @ 21.00—4 mos.
Red-short, No. 1 Coke	20.00 @ 21.00—4 mos.
Cold-short, No. 1 Stonecoal	19.00 @ 20.00—4 mos.
CAR WHEELS AND MALLEABLE.	
Hanging Rock	30.00 @ 35.00—4 mos.
Southern and Western Brands	30.00 @ 35.00—4 mos.
ORE.	
Lake Superior	8.50 @
Virginia Hematite (Washed)	4.25 @

CHATTANOOGA.

Specially reported by S. B. Lowe, dealer in Metals, under date of July 2d: Pig iron has been active the past week, with movements of about 1200 tons, also 650 tons Old Rails. Concessions are being made on round lots of 500 tons and upward. Old wheels are being inquired for with some sales at \$17 to \$18.

COKE.	
No. 1 Foundry, extra	\$20.00 @ 21.00
No. 2 Foundry	19.50 @ 20.00
No. 3 Foundry	17.00 @ 18.00
Gray Forge	15.00 @ 16.00
White and Mottled	14.00 @ 15.00
HOT-BLAST CHARCOAL.	
No. 1 Foundry, extra	\$21.50 @ 22.50
No. 2 Foundry	19.50 @ 20.00
No. 3 Foundry	17.50 @ 18.00
Gray Forge	16.00 @ 17.00
White and Mottled	15.00 @ 16.00
COLD-BLAST CHARCOAL.	
Car Wheel Metal	\$22.50 @ 27.50
extra standard	24.50 @ 29.50
Muck Metal	17.50 @ 20.50
Forg Bar	29.00 @ 31.00
Old Car Wheels	17.00 @ 18.00
Old Rails per ton	16.00 @ 17.00
Brown Hematite Ore 50 to 56 per cent.	1.75 @ 2.25
Red Fossiliferous Ore 50 to 56 per cent.	1.50 @ 1.75

BALTIMORE.

Messrs. WYETH & BROTHER, Iron and Steel merchants, 46 and 48 South Charles street, report us the following prices, under date of July 2d: The near approach of the national holiday has a tendency to increase the already existing quiet of this market. The business doing is confined to the actual wants of buyers, values remaining unaltered, but steady.

AMERICAN REFINED BAR IRON.	
1 to 6 wide by 3/4 to 1 thick	1.05 to 2c. @ 1/2 lb.
1 to 4 1/2 wide by 1 1/4 to 1 thick	1.05 to 2c. @ 1/2 lb.
Round and Square, ordinary sizes from 3/4 to 2 inclusive	1.05 to 2c. @ 1/2 lb.
Hoop Iron, 1 1/2 wide and upward	3 to 3 1/2c. @ 1/2 lb.
Band Iron, from 1 1/4 to 4 in. wide	3 to 3 1/2c. @ 1/2 lb.
Horsehoe Iron 3/4 to 1 wide by 3/4 to 1 thick	3 to 3 1/2c. @ 1/2 lb.
Norway Nail Rods	3 1/2 to 9c. @ 1/2 lb.
Black Diamond Cast Steel, Flats, Squares and Octagons, ordinary sizes	14 1/2 to 15c. @ 1/2 lb.
Machinery Steel	8c. to 9c. @ 1/2 lb.
Cast Spring Steel	7 1/2 to 8c. @ 1/2 lb.
Homogeneous Steel Plate	8 1/2 to 9c. @ 1/2 lb.
Perkins' Horseshoes, per keg of 100 lbs.	\$3.92 1/2 @ 1/2 lb.
R. R. Spikes	2 1/2 to 3c. @ 1/2 lb.
Common Horse Nails, from 10 to 18c. per pound	10 to 18c. @ 1/2 lb.
Putnam Horse Nails	23 to 25c. @ 28c. per lb.
Globe Horse Nails	23 to 25c. @ 28c. per lb.

Messrs. R. C. HOFFMAN & Co., Iron and commission merchants, No. 23 South Frederick street, report the Pig Iron market as follows, under date of July 2d: We have to report a dull iron market, and do not look for any improvement during this month. Sales light and limited to immediate wants at about the following prices:

Baltimore Charcoal	\$23.00 @ 30.00
Virginia	28.00 @ 32.00

Anthracite No. 1	20.00 @ 21.00
"No. 2	19.00 @ 20.00
"No. 3	18.00 @ 19.00
White and Mottled	15.00 @ 16.00

FOREIGN.

(Monteur des Interests Matérielles.)

PARIS, June 18, 1877.—Metals.—Business, which had been hampered for some time by rainy weather and the political uncertainties, is picking up again, and to some extent the metal trade with it. Copper.—The statistical aspect is still unfavorable to the holding interest, but the finer kinds of copper being scarce, an advance has been established in Australia across the channel without benefit to common sorts. At Paris little has transpired, and we have no change to note, but prices are decidedly weak. We quote Chili Bars 185 francs the 100 kilos; common ditto, 180; Ingots and Slabs, 170; English Best Selected, 192.50, and pure (Cuprodo) Ore, 205. At Havre the market is declining; they quote Chili Bars, first brands, 182.50 to 183.75; good current ditto, 180; Lots and Urmetta, 176.25 to 175.50. Paris conditions. Copper is better held at Havre, although the arrivals of old copper coin from Egypt continue to be large; sales thereof have just been effected at 155 francs the 100 kilos. The following are the quotations: Roul Tokat, 175 to 1

about two tons; but from the present appearance of the ground in the end of this driving it may be safely concluded that there is a good chance of a big change in the value of this level. *Spectator* Mine.—The East continues very poor. The end of the driving shows a few spots of ore, but the ground does not look favorable. The 27 shaft, toward Kelly's shaft, produces a little ore, but not enough to value. Sinking has been started below the old workings in the open cast pit, but prospects there are not very cheering. April yield of the Okeley mines, 550 tons of 34 per cent; from the Spectator mines 33 tons of 25 per cent. *Trial Mine*.—The driving at the Karolusberg continues very poor. Unless there is a favorable change shortly will be suspended, and the men will be put to cross-cutting north and south. At Nabakey the shaft below the 17 is passing through some layers of unproductive ground. The level at Narap is at present yielding a little more copper ore, but not enough to value. The trial shaft of the Okeley Mine is being sunk through ground which is spotted throughout with copper ore, but nothing of value has yet been intersected.

EAST INDIES.

(Dunlop & Co.)

BATAVIA, JAVA, May 7, 1877.—Tin.—There will be sold at auction in this city 10,000 piculs Billiton Tin on each of the following Mondays: June 11, Aug. 12, Oct. 8 and Dec. 10. Iron.—Sales have been effected of Swedish at 11.50 to 12.50 guilders to arrive, while English is selling on a moderate scale at unchanged rates. Copper.—Sheathing is in limited inquiry. Coal.—English is offering about, but no sales have resulted, shipments being still too distant. No Australian in the market. *Exchange*.—The result of the government sale on the 28th ult. was again a success, as the whole 1,500,000 guilders were allotted at par and better. For the French mail the transactions in private paper on Holland were on an unusually large scale at rates ranging from 100½ to 101, the bulk being done at 100½. Sterling credits found buyers at 11.95 to 12 per pound sterling, while the demand for bank bills was met at 12.05.

(Allen, Spence & Co.)

COLOMBO, Ceylon, May 12, 1877.—Plumbago continues in fair request; prices unchanged. We quote free on board, cost and commission, but without freight, exchange at par, 2 per rupee; Lump, cleaned, including packages, per ton and duty, 33½; Chip, 18½, and Dust, 13½; freight to New York, 65. There have been exports to the United States from the island since Oct. 1, last, 56,500 cwts, against 34,850 last year; to England, 16,219; to Marseilles, 234; to India, 10; to Australia, 200; together this season thus far 73,063, against 51,944 in 1876. *Exchange*.—Credits, 1894. *Shipping*.—The *Venus* sailed for Alleppey on the 26th ult. with cargo. She has been followed by the *Una*, 352 tons, which will sail for Galie next week to fill up. The sailing vessel rate for Plumbago for London is 35 per ton. *Exchange*.—Credits, 1894. 15-16; documents, 1-10-16; banks' selling rate, 1/9-11-16; private rate for credits, 1/9-13-16, all at six months' sight on London.

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From our Regular Correspondent.)

SHEFFIELD, Eng., June 18, 1877.

TRADE GENERALLY

rules very quiet in all directions, the only branch in which there is any real movement in a forward direction being the rail trade, and that mostly in respect of steel rails. This fact is very well shown by the special Board of Trade return for May. This return shows that of iron rails the total export was 21,374 tons, of the value of £142,830, the principal buyers being Sweden and Norway (5246 tons), United States (1376 tons), British India (4144 tons) and Australia (4371 tons). The quantity of steel rails exported in May reached 32,475 tons, valued at £287,703. Of this total Russia took 13,338 tons, Sweden and Norway, 3005 tons; Germany, 2923 tons; British North America, 6564 tons; British India, 2380 tons, and Australia, 2640 tons. These statistics prove very clearly what I have been asserting for some time past—namely, that the rail trade is improving, and that, Russia is again our best customer for this class of manufactures. It is also within my knowledge that the works best employed on steel rails, are the Dowlais, South Wales; Dronfield, Sheffield; Brown, Bayley & Dixon, Sheffield; Phoenix, Sheffield; the Barrow Company and the Scottish Steel Company, Glasgow. The Phoenix establishment alone is almost entirely running on home orders.

GENERAL GRANT.

Your famous ex-president is now meeting with a more prominent series of public receptions. On Friday last the General was presented with the honorary freedom of the city of London at the Guildhall in the presence of nearly 1000 ladies and gentlemen. The freedom was given in the customary gold casket—this time of unusually fine workmanship. In reply the General made the following neat little speech:

"I believe that this honor is intended as much for the country which I have served in two capacities, quite as much as for myself. I am glad that this is so, because I want to see the happiest relations existing not only between the United States and Great Britain, but also between the United States and other countries. Although a soldier by education, I have never felt any sort of fondness for war, and I have never advocated it except as a means of producing peace. I always wanted peace, even if I had to fight for it. I hope that we shall always settle our differences amicably, as we did in a recent instance. I believe that that settlement has had a happy effect on both sides, and that from month to month and year to year the tie of common civilization and of common blood is getting stronger between the two countries."

JOHN BARNALL & SONS (LIMITED)

issued their report on Thursday last. The capital of the concern is £100,000 in 10 shares, with power to increase to £300,000. The balance against the company at the end of 1875 was £13,761, and the present report details a further loss in the following terms: "The year's working has resulted in a loss of £14,972 16 s., after writing off £3062. 18 s. 3 d. for depreciation of colliery plant and exhaustion of freehold minerals, and part of debenture interest, £5267. 15 s. This unfavorable result is attributable to the continued extreme depression in trade and the fall in the price of iron, and consequent depreciation in value of stocks. The continuance of short hours of labor and foreign competition have rendered it very difficult to keep the works employed even half-time. The company's property has been kept in a thoroughly efficient state at a cost of £10,330. 14 s. 3 d., which has been charged to revenue. In accordance with a resolution of the annual general meeting of 4 March 29, 1876,

Major William and Mr. Joshua Fellows were elected members of the board. Your directors have to report that Messrs. Joseph and Edward Naylor resigned the management in August last; Mr. Edward Naylor previously resigned his seat at the board. The directors have appointed Mr. Alfred Jones as manager of the company's works."

The directors of THE NANT-Y-GILO AND BLAINA IRON WORKS COMPANY

have just issued an interim report which states that, "although sub-lettings at rents of £6000 per annum have been approved, the company have still retained enough pits to turn out their production of last year—about 400,000 tons of coal. By August 28, in consequence of mortgages falling due, a sum of £145,000 will have to be provided for. Less certain purchases made, and arrangements entered into, this sum will be reduced to £138,022. Certain freeholds and leaseholds, comprising 4978 acres, would have to be charged as security. The income derived from properties named would be annually equal to £13,684, in addition to the minimum rents for sub-lettings—£6900. Rates payable by Messrs. Barnes of 4d. per ton on all coal passed over the company's railway would be £1166, bringing up a total of £21,750; less rent to Lord Aberavenny, £1150, this sum will be reduced to £18,600." The last named amount, say the directors, is a safe and positive income which mortgagees might receive. The interest on the £138,000 at 5 per cent. would amount to £6900, which would leave a balance of £11,700 to pay subsequent charges. The charges are: Second mortgage, £50,000; debentures, £70,000; in all, £120,000. Interest on the former would amount to £2500 at 5 per cent.; on the latter £7000 at 10 per cent.; making £9500, and giving a surplus of £2200, which would be available for expenses. On an improvement in the coal trade the minimum rents would doubtless increase, and the excess would be equal to £3400. The coal raised by the company is estimated to yield a profit of 6d. per ton, equal to £10,000; and the value as rent of land on mines is put down at £8000, giving a total of £21,400; £5000 a year should be set apart to redeem mortgages, leaving £16,400, which might go for dividends to shareholders. Other assets and the valuable surface property are also alluded to, as well as the emoluments from the company's private railway. There is an area of 2200 acres still unlet of the company's property. The directors put down the company's misfortunes to losses as manufacturers, the income not having fallen off in any one year. They add: "In the foregoing report no mention has been made of one of the vendors' mortgage, transferred by Mr. Carlton to Mr. Tamplin, amounting to less than £200,000, this mortgage being involved in the company's suit against Messrs. Carlton & Grant for recovering the principal sum of £312,500, the amount received by those parties for promotion money."

THE PELSALL COAL AND IRON COMPANY have also lost £5086 on the year's trading, a fact which has so exasperated the shareholders that they have passed a vote of censure on the management, and have appointed a committee of investigation, which will report to a general meeting to be held on July 18th.

THE NEW ZEALAND TITANIC STEEL AND IRON COMPANY have recently sent over some of their pig iron, which is made from the sands of New Plymouth Bay, in Taranaki. There are two furnaces belonging to the company, and the pigs which have come to this country are of 78 pounds each. On being tested by the Shelton Bar Iron Company, Stoke-on-Trent, it has been found that the waste was nearly 20 per cent., about 1 ton, 3 cwt. 3 qrs. and 14 lbs. of pig being needed to make one ton of puddled bars. The quality of these bars was excellent, seeing that they bore a tensile test considerably in excess of the Admiralty test of 22 tons per square inch. It is stated that the original cost of the pig in New Zealand is £3. 10 per ton.

THE CITY OF BERLIN,

Inman steamer, has now broken down on her passage from New York to Liverpool, and has been towed in by the National steamer Spain. These accidents seldom happen singly. As the immortal William says, "They come not single spies, but in battalions."

THE WEEK'S FAILURES

have not been on a large scale. Among the number have been those of Frederick Brown, of London and Luton (Bedfordshire), iron-founder, with debts set down at £16,000, and of Francis Cordwell, carpet manufacturer, Dewsbury, who owes £41,000.

THE ADMIRALTY,

in order to guard against defects in chain cables, have just issued circulars to superintendents of the dockyards and others in which those concerned are enjoined to retest their chain cables at all possible times when there is a chance. When ships are on foreign stations and no testing machine is available, captains are to endeavor to make arrangements to land the cables in a foreign yard in order that they may be carefully cleaned and minutely examined.

AMERICAN BEEF

formed the subject of a good deal of contradictory evidence before a Parliamentary select committee last week. A Mr. Lambert, cattle salesman, of Manchester, spoke unfavorably of it, but Mr. Archibald Hamilton, a large fletcher, of Glasgow, stated that he got 10,000 pounds of American meat last week, and had dealt largely in it for some time. He had found it invariably good. Mr. Sheldon, a large grazier and dairy farmer in Staffordshire, stated that he had been in America to collect statistics for the Royal Agricultural Society. He found there were in the United States 23,000,000 cattle, 35,000,000 sheep, and 26,000,000 pigs. Allowing the Americans to eat the same as we did—100 pounds per head—they could still spare more than we ate altogether out of their surplus stock. Cattle from Chicago, traveling 1000 miles by rail to New York, were there slaughtered, and were brought over at a cost in all of £4 over the £14 bid for them in Chicago, as against £8. 12 s. the cost of live cattle from New York. He found the American beef perfectly good, both hot and cold;

it had often been kept several days before being cooked. Trade from New York began in October, 1875, with 136,000 pounds, and gradually increased even through the hot months to April of the present year, when it had reached 6,022,013 pounds. From Philadelphia the trade commenced in October last with 150,610 pounds, and had risen to 25,665,000 pounds in April last. He believed the trade would be permanent.

SCOTCH PIG IRON

has remained very quiet all the week, and prices have been weak throughout. The stock held in Messrs. Connal's warehouses now reaches 139,867 tons, which is, I believe, the largest quantity for many years. Shipments are not so well upheld, although transatlantic freights are unchanged.

James Watson & Co., writing from Glasgow on June 15, said: "We have to report a very quiet market for Scotch pig iron this week at lower prices, business being transacted in warrants from 54½, one month, and 53 10½, cash, to 53 7½, cash, closing a shade firmer at 53 9 per ton. Shipments last week were 7733 tons against 10,330 tons in the corresponding week of 1876. We quote:

	No. 1.	No. 2.
G. M. B., at Glasgow	55 3/4	55 1/2
Gartsherrrie, "	55 3/4	55 1/2
Coltness, "	55 3/4	55 1/2
Summerlee, "	55 3/4	55 1/2
Langloan, "	55 3/4	55 1/2
Cambro, "	55 3/4	55 1/2
Caldar, at Port Dundas	55 3/4	55 1/2
Glenarnock, at Ardrossan	55 3/4	55 1/2
Eglinton, "	55 3/4	55 1/2
Dalmellington, "	55 3/4	55 1/2
Shotts, at Leith	55 3/4	55 1/2
Kinnell, at Bo'ness	55 3/4	55 1/2

John E. Swan & Bros., prices current of the same date gives Coltness No. 1, 65½; Glenarnock No. 1, 59½; Eglinton No. 1, 55½.

The quotations of Wm. Colvin & Co. agree with the foregoing.

MESSRS. NAPIER'S SHIPYARD,

near Glasgow, which was sold some time ago, is now said to have been bought by the English government for £260,000—said to be a very low price for what is in reality a splendid property.

THE NORTHERMBERLAND STRIKE

of coal miners has now practically ended. The men were polled as to whether the strike should continue or arbitration be resorted to, and an immense majority voted for the latter proposition. This caused the coal owners to give way a little, hence the dispute has terminated, and most of the men will have resumed work this morning. On the Clyde the shipwrights are still out. A number of Dutch carpenters have been brought over to fill some of the vacancies, and are working Dutch hours—5 a. m. to 7 p. m.—for Scotch wages—7 per day.

TRADES OF SHEFFIELD.

There is again no change to report in the general condition of the local iron trade and its allied industries, all of which remain quiet. Prices are hardly upheld, except for special brands, and there are symptoms of further reductions taking place before long. In pig iron the week's sales here do not appear to have been at all large, either in respect of forge or foundry qualities. There are still considerable lots of hematite pigs coming into the district from the West Coast, but they are for the most part in fulfillment of old engagements.

The average condition of the local trade was pretty well set forth in a speech made the other evening by Mr. J. Stores Smith, the well known managing director of the Sheepbridge Iron and Coal Company, near Sheffield. After remarking upon the bad state of trade, Mr. Smith said he "wished he could hold out the hope that the bottom of the depression had been reached, but only that very day he had heard of less demand and more lowering of prices than ever. When it was to change he did not know, but he did think it would be a long time before prosperous times came back again, and the return of those times must be through personal economy and hard work." Coming from a gentleman so well known in the trade as Mr. Smith, these remarks will have more weight than any comments of my own, although I may say that what is just recorded fully corroborates the statements which have appeared in these reports for many months past.

Some interesting remarks were also made at the general meeting of the shareholders of William Cooke & Co., Limited, Sheffield, on Friday last. The report showed a loss on the year's working, but the shareholders expressed their satisfaction that it was not heavier in the present state of trade. Several questions were also asked as to the business of the company, relative to which it was stated that the manufacture of spiegeleisen had now been given up. As they could sell merchant iron at a profit, the furnaces were being utilized in that direction. When the company was formed their specialty was the manufacture of steel iron. At that time they made 270 to 280 tons per week, whereas in the past year they had only produced 360 tons. All the plant, however, was good, and ready for a revival in trade. Last year there had been a good trade done in spiegeleisen, but they had now severe competition. Their Thornaby iron ore mines were raising a large quantity of ore every week. The new hoop mill which had been started during the year was also so far a success.

In the steel rail trade I have no particular change to notice. The two or three works just outside the town, which have for some time been fairly well engaged, are still doing a good business, one of them being said to have orders on the books sufficient to keep the works going on one shift until October. In the town the older rail mills are not busy, to put the matter in a very general way. The armor plate mills and shops are also quietly engaged; hence there cannot be that "heavy output" which is so constantly reported in other quarters.

On Friday last the firing of a shot in one of the workings of the Kent's thin coal seams at the Aldwarke Colliery of John Brown & Co., Limited, caused some of the bratticing props to take fire, and finally resulted in the ignition of the coal seam face. By dint of strenuous efforts, however, continued for a dozen hours, the fire was got under, the seam being filled with 3 feet of water. The fire at the Unstone Silkstone Colliery still continues, although shafts have been sealed up. The returns just issued show that during May

the Midland Railway Company carried 140,874 tons of coal to London; the London and Northwestern, 111,613 tons; the Great Northern, 91,167; and the Great Eastern, 67,739 tons. It now appears that the negotiations between the Great Northern and Great Eastern lines are broken off, the Great Northern having declined to guarantee a dividend at the rate of 6 per cent. for a period of ten years from the date of fusion. It is understood that the South Yorkshire Miners' Association will shortly be entirely quit of the unfortunate Shirland Colliery, in the purchase and working of which the association has sunk over £30,000. The land on the surface is now to be sold, the pit having already been in the possession of the new owners for some time. A further meeting of the shareholders will shortly be held for the purpose of receiving the final report of the directors and auditor as to the manner in which the business has been conducted.

The Belper, Derbyshire, horse nail makers have informed the Staffordshire men of the same trade, who are now out on strike, that they—the former—will support them providing they will continue out until a recent reduction of 3d. per 1000 be made good. At present the price paid in both districts is 4 per 1000.

SHEFFIELD AND AMERICAN MANUFACTURES.

The subject of the relative merits and demerits of your and our manufactures continually crops up in public as well as privately. You may hear people acknowledging the great progress you are making in active competition with us, and the press every now and then warns the public—particularly the "workingman" section thereof—that unless "something is done" Sheffield will sooner or later sink into a condition of decadence which no well regulated mind of the present day can imagine. The Sheffield *Telegraph* of the other day, for instance, mentions the complaints received from Canada as to the old-fashioned and clumsy goods sent there by our manufacturers, in spite of special instructions and actual patterns to the contrary. For this state of things—which undoubtedly operates to your advantage—the masters blame the trades' unions and the men; while, in turn, the men allege that their employers wish them to make new goods, at prices on which they could not live—hence, their objection to change at all.

STAFFORDSHIRE AND BIRMINGHAM.

From South Staffordshire it is reported that a traveler for Landers, Frary & Clark, of New Britain, Conn., has been showing round a stock of that firm's hardwares of what would be called "good leading lines." I do not hear that his samples were most closely inspected, and that the result somewhat surprised the Staffordshire manufacturers, who can even yet hardly comprehend that the United States market is lost to them. In the iron trade proper there has been no especial change during the week, the market generally being exceedingly quiet, with a decided tendency to unofficial lower prices. The founders are perhaps doing the best business, and next to them come the firms devoted to the manufacture of riveted work. One concern of the latter class at Darlaston has just finished an angular gasometer tank 82 feet diameter by 60 feet deep. In merchant iron there is really exceedingly little doing, although even the best works are very poorly engaged and prices are put down to the most tempting level. Spain and Japan are taking several large anchors, ranging from 50 to 70 cwt. each. The edge tool, lamp and chandelier trades are fairly well engaged. Bolts, nuts, patent hinges, plate locks, hat and coat hooks, iron washers and several other kinds of similar goods are reduced in price by 2½ to 5 per cent.

SOUTH WALES AND MONMOUTHSHIRE.

It is rumored that the coal owners of South Wales have resolved to take steps for limiting the output, on the ground of overproduction and a want of profit. During the month of May no fewer than 383,130 tons were exported from Cardiff alone, and the Great Western line took 70,000 tons to London, to say nothing about other places and the local consumption for domestic and manufacturing purposes. The iron trade, however, has relaxed somewhat, last week's exports having only been 1597 tons. It is supposed that Mr. Crawshaw will restart the Cyfarthfa furnaces in the ensuing autumn, as there appears to be some certainty of his being able to secure orders for iron rails, which he can make more cheaply than any other Welsh ironmaster. The tin plate works are very quiet.

THE METAL MARKETS

have been quiet, and in some respects prices have become rather more favorable for buyers.

Messrs. Von Dadelzen & North say: "Copper has been quiet. Small sales of Chili bars g. o. b. at £69, on the spot, and £69. 5½ to £69. 10½ to arrive. Named brands have realized £70. A cargo of Chilean furnace stuff sold, to arrive in Swansea, at 13½ per unit for ore, and 14½ for regulus. The dead lock in Wallaroo continues. No announcement has been made of a public sale. Small lots from second hands on the spot have been sold as high as £80. 10 to £81; Burra is quoted £75. 10; English tough, £75 to £76; select, £76 to £77; strong sheets, £81; Tin has been very dull; small parcels of Straits sold at £68. 15 to £69; and of Australian at £68 to £67. 15; Dutch market quiet; Banca, 42½; Billiton, 41½. The sale of Billiton in Batavia realized 45.72½ per picul, or about 41½ per 50 kilos in Holland. English ingot, £73 to £74. Tin Plates.—Most makers ask 1½ advance—18½ to 19 for coke. Lead has been flat, with sellers of English pig at £20. 10½, and soft Spanish at £20. 5 to £20. Spelter.—Nominally £20 for Silesian. Quicksilver, after selling at £7. 5½, was yesterday reduced to £7. 2 6. Antimony, £48."

Messrs. French & Smith report: "Tin, quiet, Straits at £68. 10. Australian, £67. 10. Copper, easier; Chili bars at £68. 15 to £69. Lead, dull; Spanish at £20; English, £20. 10 to £20. 15."

The official report of the Lombard Metal Exchange says: "Metals.—Copper rather easier; Chili bars, g. o. b., 50 tons sold at £68. 15 for forward delivery; sellers of spot bars at £69; nothing reported in Australian; English tough, £74. 10 to £75. 10; best selected, £76 to £77; strong sheets, £81; a fair quantity of India sheets sold during the week

at £80. Tin, quiet; Straits, sellers, £68. 10½; Australian quoted £67. 10 to £67. 15½, with a moderate business done; English ingots, £72. 10 to £74. Iron rather firmer at 58½ for Scotch pigs. English pig lead, £20. 10½ to £20. 15; Spanish, £20 to £20. 5½. Spelter, £20, nominal. Quicksilver, 72 6. Antimony, £48 for star."

Latest Liverpool prices are:

Iron: f. o. b. in Liverpool, per ton.

	£ s. d.	£ s. d.
Merchant bar	6 10 0 to 6 15 0	
" in Wales	6 0 0 to 6 5 0	
Staffordshire	7 0 0 to 7 15 0	
Hoop	7 10 0 to 8 20 0	
Sheet	8 15 0 to 9 15 0	
Nail rod	7 10 0 to 8 0 0	
Bar, best crown	7 0 0 to 8 0 0	
Boiler plates	9 0 0 to 10 0 0	

Tin Plates: f. o. b. in Liverpool, per box.

	£ s. d.	£ s. d.
Charcoal, I. C.	1 2 6 to 1 4 0	
Coke, I. C.	0 18 0 to 1 0 0	

Copper: Delivered in Liverpool, per ton.

	£ s. d.	£ s. d.
Bolt and sheathing	84 0 0 to 0 0 0	
Tin	0 0 0 to 0 0 0	
Tough cake	78 0 0 to 0 0 0	
Best selected	78 0 0 to 0 0 0	

Forty-two Inch Car Wheels.

Mr. Chamberlain, of the Allston shops of the Boston and Albany Railroad, is building at the Allston shops trucks for the new 42-inch car wheel, which will be shortly tried on the Boston and New York express cars. Among the roads now trying the new wheel are the Grand Trunk, Lake Shore and Michigan Southern, Flint and Pere Marquette, Atchison, Topeka and Santa Fe, and the Boston and Providence railroads, and other roads are preparing to introduce them. The advantages of the 42-inch over the present 33-inch wheel are: About one quarter less revolutions in running a given distance, consequently much less axle friction and liability to hot boxes; imperfections of the track are felt less, as a large wheel passes an obstacle or inequality on the track with greater ease, on the same principle that a buggy with a big wheel rides easier than one with a smaller; and the wear to both wheel and rail will be less with the 42-inch wheel, because of a greater effective area on the rail. The only special change in truck construction will be the lowering of the bolster on which the center plate of the car body directly stands. The car will hang as low as before, without the necessity of cutting a recess in the wheel piece; the truck will be only one inch higher than with the 33-inch wheel.

Mr. W. W. Snow, of the Ramapo Wheel and Foundry Company, Ramapo, N. J., has for many years given his attention to wheels of this size, and recently Mr. White, the designer for the company, at his suggestion, has designed a truck in which the large wheels can be used. In the Ramapo truck the wheel piece, which is faced with iron after the Pullman pattern, is recessed out to allow the end of the equalizing bar sufficient room to play, and lower the frame of the truck and bring the body of the car down, so that the draw-bar will be of the proper height. By lowering the swing beam and spring plank of the Boston and Albany truck, the body of the car is brought down without the necessity of facing the wheel pieces of the truck with iron. It is said that this makes a great saving in weight.

A Boston paper says: The Boston and Albany wheel will most likely be spoked instead of plated, because of greater lightness and neater appearance, the strength being just the same.

New Alloy.—A very beautiful new alloy, intended to replace brass in various ornamental uses, especially in window and door furniture, has been invented by Mr. W. A. Hopkins, of Paris. The alloy is composed of copper, tin, spelter or zinc and lead, which metals are manipulated. A crucible is placed in the furnace and fired to a red heat, and into the crucible thus heated the metals are placed in the proportions of—tin 1½ (say) 10z., spelter or zinc 3 oz., lead 5-16ths of an ounce. These are the proportions he prefers to use, as he has found them to give excellent and satisfactory results, but he does not intend to confine himself rigidly to the precise proportions named, as they may, perhaps, be slightly varied in some particulars without materially detracting from the beautiful color of the alloy which it is intended to produce. The molten metals are kept well stirred, and any impurities therein should be removed. When thoroughly mixed this alloy, which is termed the first alloy, is poured off into ingot molds and left to cool. Copper in the proportion of eight parts to one of this first alloy is then placed in the crucible and brought to melting heat, when the tin or first alloy is added and intimately mixed with the copper, for which purpose the molten mass must be well stirred for several minutes. It is then poured into ingot molds for sale in the form of ingots, or it may be poured into pattern molds so as to produce the articles required. This is the mode of manipulation which it is preferred to employ, as an opportunity is thus afforded of removing any impurities from the first alloy before mixing it with the copper, but all the metals may, if preferred, be mixed together in the proportions given and melted at one operation. By this means an alloy is obtained of great strength and of a very beautiful appearance, and which is particularly suitable for small work, such, for instance, as window and door furniture and other house furniture which is usually made in brass or other alloy of copper, though it is not intended to confine its use to such articles.

Baird & Houston, of Philadelphia, have been awarded the contract by the Lighthouse Board for the building of the new iron twin screw tender Pansey. The vessel will be 153½ feet long, 10½ feet depth of hold and 25 feet beam. She will be rigged as a fore and aft schooner, with pole topmasts. She will be propelled by an inverted surface condensing engine, 21 inch cylinder and 25 inch stroke, driving one right and one left-handed screw. The boiler is one of the return overhead flue type, 8 feet front, 8 feet 6 inches diameter, 20 feet 6 inches long. Chimney 24 feet high and 42 inches in diameter. She will be finished this fall.

Special Notices.

FOR SALE.

Bargains Extraordinary.

New and second hand machinery for sale, as follows—the new machines being marked N, all others being second hand.

Machine Tools.

PLANERS.—22 ft. x 45 in. square, \$900; 16 ft. x 42 in. square, \$750; 12 ft. x 30 in. square, \$500; 10 ft. x 30 in. square, \$450; 8 ft. x 27 in. square, \$400; 6 ft. x 24 in. square, \$350; 5 ft. x 20 in. square, \$300; 4 ft. x 18 in. square, \$250; 3 ft. x 16 in. square, \$200; 2 ft. x 14 in. square, \$150; 1 ft. x 12 in. square, \$100.

GEAR CUTTERS AND MILLING MACHINES.—New Haven gear cutter, cutting 48 in. diameter, \$200; combined gear cutter and milling machine, \$24 in. N. 450; milling machine, plates 15x18, N. 340; No. 3 Pratt & Whitney milling machine, with full set tools, \$480; 4—No. 2 Wood, Light & Co. milling machines, each \$200; 4—No. 1 Wood, Light & Co. milling machines, each \$175. UPRIGHT DRILLS AND DRILL PRESSES.—40 in. Hiles & Jones radial drill, \$475; 4 spindle, Pratt & Whitney drills, N. 325; 12 in. Warner & Whitney upright drill, \$300; Pond No. 2 1/2 upright drill, N. 350; Pond No. 1 upright drill, N. 310; 26 in. upright drill, N. 315; 24 in. upright drill, N. 310; 22 in. upright drill, N. 305; 20 in. upright drill, N. 300; 18 in. upright drill, N. 295; 16 in. upright drill, N. 290; 14 in. upright drill, N. 285; 12 in. upright drill, N. 280; 10 in. upright drill, N. 275; 8 in. upright drill, N. 270; 6 in. upright drill, N. 265; 4 in. upright drill, N. 260; 3 in. upright drill, N. 255; 2 in. upright drill, N. 250; 1 1/2 in. upright drill, N. 245; 1 in. upright drill, N. 240; 3/4 in. upright drill, N. 235; 1/2 in. upright drill, N. 230; 3/8 in. upright drill, N. 225; 1/4 in. upright drill, N. 220; 1/8 in. upright drill, N. 215; 1/16 in. upright drill, N. 210; 1/32 in. upright drill, N. 205; 1/64 in. upright drill, N. 200; 1/128 in. upright drill, N. 195; 1/256 in. upright drill, N. 190; 1/512 in. upright drill, N. 185; 1/1024 in. upright drill, N. 180; 1/2048 in. upright drill, N. 175; 1/4096 in. upright drill, N. 170; 1/8192 in. upright drill, N. 165; 1/16384 in. upright drill, N. 160; 1/32768 in. upright drill, N. 155; 1/65536 in. upright drill, N. 150; 1/131072 in. upright drill, N. 145; 1/262144 in. upright drill, N. 140; 1/524288 in. upright drill, N. 135; 1/1048576 in. upright drill, N. 130; 1/2097152 in. upright drill, N. 125; 1/4194304 in. upright drill, N. 120; 1/8388608 in. upright drill, N. 115; 1/16777216 in. upright drill, N. 110; 1/33554432 in. upright drill, N. 105; 1/67108864 in. upright drill, N. 100; 1/134217728 in. upright drill, N. 95; 1/268435456 in. upright drill, N. 90; 1/536870912 in. upright drill, N. 85; 1/1073741824 in. upright drill, N. 80; 1/2147483648 in. upright drill, N. 75; 1/4294967296 in. upright drill, N. 70; 1/8589934592 in. upright drill, N. 65; 1/17179869184 in. upright drill, N. 60; 1/34359738368 in. upright drill, N. 55; 1/68719476736 in. upright drill, N. 50; 1/137438953472 in. upright drill, N. 45; 1/274877906944 in. 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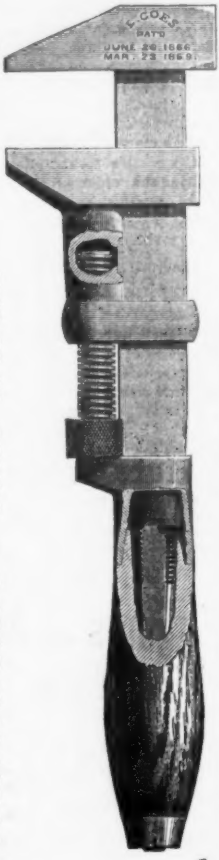
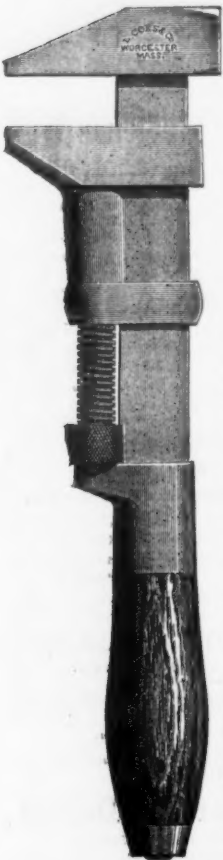
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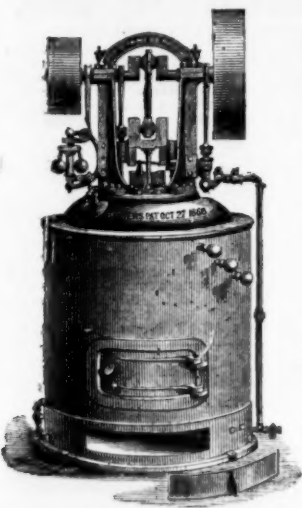
These recent improvements in combination with the nut inside the ferrule firmly screwed up flush against square, solid bearings (that cannot be forced out of place by use), verifies our claim that we are manufacturing the strongest Wrench in the market.

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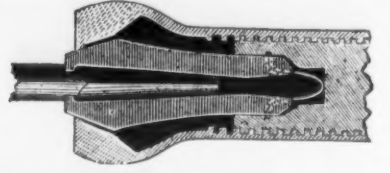
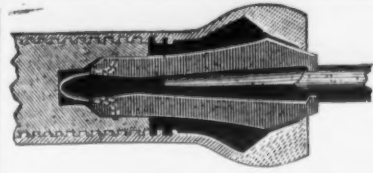
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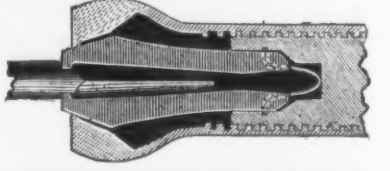
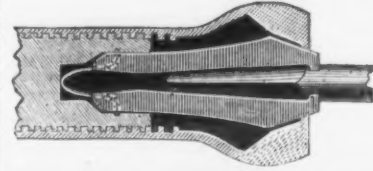
The United States Court recently decided that the Millers Falls Company has the exclusive right to make this style of Brace Jaws, and a higher court long ago decided that they are the only jaws which will hold tools of any size or shape.

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These Anvils are superior to the best English, or other Anvils, on account of the peculiar process of their manufacture (invented and used only by this concern), and from the quality of the materials employed.

The best English Anvils become hollowing on the face by continued hammering in use, on account of the fibrous nature of the wrought iron—causing it to "settle" under the face.

The body of the Eagle Anvil is of crystallized iron, and no settling can even occur; the steel face, therefore, remains perfectly true. Also, it has the great advantage, that being of a more solid material, and consequently with less rebound, the piece forged receives the full effect of the hammer, instead of a part of it being wasted by the rebound, as of a wrought iron anvil. An equal amount of work can, therefore, be done on this Anvil with a hammer one fifth lighter than that required when using a wrought iron anvil.

The working surface is in one piece of JESUP'S BEST TOOL CAST STEEL, which, being accurately ground, is hardened and given the proper temper for the heaviest work. The horn is covered with and its extremity made entirely of steel. The body of the Anvil is of the strongest grade of American iron, to which the cast steel face is warranted to be thoroughly welded and not to come off.

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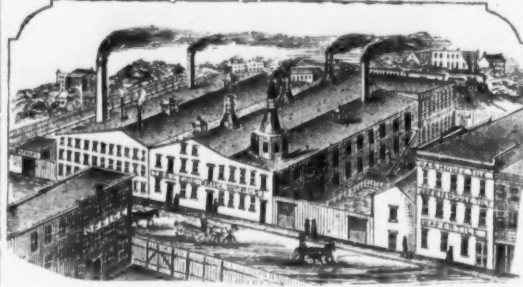
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EXHIBIT IN THE Philadelphia Permanent Exposition.

We have made some extensive improvements on our exhibit in the Main Building of the late Centennial Exhibition, to such an extent that it now embraces many new and interesting features; all of which combined cannot fail but be of special service to those interested in Tin Plate and its workings. Nearly all of the articles on exhibit have been made with great care and are intended especially for our display. We have had them all attractively arranged in their proper order and position, carefully catalogued, thus making virtually the first and only, strictly complete exhibit of its kind ever presented to the public. We cordially invite all to visit it and give it a careful examination, and for further information, shall be pleased to see them at our office and stores, Branch Street, Philadelphia.

Our display embraces exhibits of the HENDY Prize Brand Tin Plate; Patent Patterns, such as Circles, Squares, Ovals, Oblongs, Octagons, Splayed, &c., showing the economy in the manufacture of Tin Plate and the saving of clippings to consumers; samples of the working of our own size 28x20 Roofing Tin; patented continuous Roofing Tin; our own special Boiler Sizes; Spouting Tin, &c.; Tinner's and Roofers' Tools and Machines of every description; Burritt's Double Seamers, showing their admirable uses; our stone-coal Tube Furnaces, for heating of soldering irons; samples of the celebrated HENDY Solder, very finest; Wire; Rivets; Roofing Nails; Black and Galvanized Sheet Iron. In addition to this our display of Minerals, Ores, &c., will be quite large and embrace most of the prominent Metals, both in their crude and finished state, such as samples of our HENDY Iron, carefully classified, showing the whole process of making this celebrated brand, from the rude ore to the polished sheet. We also have on exhibit: Pig Tin: Banca, Billiton, Straits, English, Australian, Refined; Lead: Spanish, English, Domestic; Soft and Hard Pig Brass; Antimony; Bismuth; Borax; Babbitt, Type and Yellow Metals; Copper: Lake Superior and Australian, &c., &c.

N. & G. TAYLOR CO.,
Manufacturers and Direct Importers of
TIN PLATE.
PHILADELPHIA.
Established, . . . 1810.
Sixty-seventh Year.

The Patent Automatic Stokers

which were shown by Dillwyn Smith at the Centennial Exhibition in the British section, and obtained the medal and highest award, are now offered to the users of steam in the United States, by the "United States Automatic Stoker Co.," under a license from Dillwyn Smith, for use on land boilers, with full confidence that the satisfactory results obtained in Great Britain and on the Continent of Europe (where over 1200 of them are in use), will be fully realized here. Some of these results are: The generation of steam from 25 per cent. and upward of steam from a given grate surface above what is obtained from the same quality of fuel fed by hand. The lessening of the cost of steam from 10 to 30 per cent. from being able with the Stokers to properly burn a lower priced fuel. The entire removal of the smoke nuisance. The lessening of the labor of the fireman. Their use also materially reduces the temperature of the fire room and also prevents the injury to the boiler caused by the contraction and expansion of the plates resulting from the frequent opening of the fire doors in hand firing. These and other advantages have secured their introduction into the boilers of many of the largest Mills and Iron Works in England and other countries, and we are now turning out an average of 10 machines per week. A few letters are given from some of those having them in use, the statements in which can be implicitly relied upon. For information respecting price, &c., apply to

THE UNITED STATES AUTOMATIC STOKER CO.,

DILLWYN SMITH, President, 2 Chestnut St., Philadelphia.

LAND MACHINES,
From A. M. Collins, Son & Co.'s Factory, Third and
Chestnut Streets, Philadelphia.

DILLWYN SMITH, Esq.—Dear Sir: After several months' experience with your Automatic Stokers, we take pleasure in stating that they have proved entirely satisfactory to us. The saving in cost of fuel we estimate at 20 per cent., increased amount of steam fully 30 per cent., beside giving us a very regular supply. The variation not being appreciable on steam gauge. Hoping you may be successful in introducing them into general use in this country, we remain
Yours, truly,
A. M. COLLINS, SON & CO.
Wigan Coal and Iron Company.

Wigan, September 29, 1875.
Dear Sir: I have pleasure in certifying that the

Stokers applied to our boilers at Kirkless have worked to our satisfaction, and have effected a saving in fuel. He good enough to put in hand a 2 more for the range of boilers at our Alexandria Pit.
I remain, yours, truly,
W. H. HEWLETT.

From J. R. Jones, Esq., Aftonwen Paper Mills, Holywell.
Your Stokers answer my purpose; without them I could not have obtained that regular supply of steam throughout the day. I formerly used coals; with the Stoker I use slack, and save fully 25 per cent. in cost of fuel. They are suitable for all boilers.

The Earl of Dudley's Round Oak Works,
Birmingham, 6th March, 1876.
I have much pleasure in stating that the Stokers you have fixed at these Works are giving most satisfactory results. The first you put down convinced me that we

could use it for burning the fine screenings or dust from the slack; and those you have since erected have fully confirmed me in that opinion, for not only do we now use the screenings we could not previously burn at all, but the generation of steam is so rapid that we have discontinued using one of the boilers, finding we can obtain by the aid of your Machine, quite as much steam from three boilers as we previously could from the four.
Yours, truly,
R. SMITH CARSON,
Hurst Mills, Ashton-under-Lyne.

30th September, 1875.
Dear Sir: We have had your Patent Mechanical Stokers in our use for some time, and find they work to our entire satisfaction, and effect a considerable saving in coal.
Yours, respectfully,
OLDHAM WHITTAKER & SONS,
Per W. THORP.
Note.—They have ten double Machines at Work.

THE AMERICAN MACHINE COMPANY, Philadelphia, Pa.,
MANUFACTURERS OF
SPECIALTIES OF LIGHT IRON WORK.



CROWN WRINGERS,

with Patent White Rubber Rolls, Galvanized Malleable Iron Frame Work, Bessemer Steel Springs, &c. Noted for Strength, Durability, Efficiency and Simplicity.
No. 3, Rolls 1 1/2 in. diam., 10 in. long. No. 2 1/2, Rolls 1 1/2 in. diam., 12 in. long.
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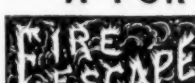


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with valuable improvements over other style Machines, Patent Spring Arrangement and Clamping Device. Noted for Superiority of Finish and Practical Advantages. The leading Machine in the market.
Sizes (length of Rolls), 4 1/2 inch, 6 inch and 8 inch.
Rolls with 10, 12, 15, 18, 22, 26 and 30 flutes.



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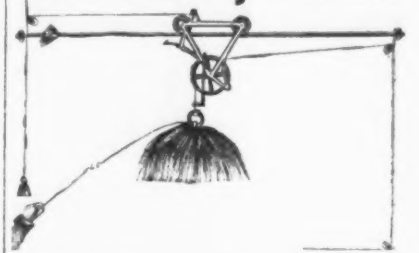
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American Hay Elevator



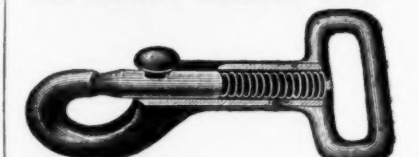
The most perfect and simple, and the only elevator that raises the hay from wagon and carries it back in the barn any distance required. It can also be used in stores, &c. This elevator received the highest award at the Centennial field trial. Price, \$12, with large discount to the Hardware trade.
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8 in. \$4.50; 6 in. \$3.00; 4 in. \$2.50.
Extra Rollers.—8 in. \$2.25; 6 in. \$1.50; 4 in. \$1.25.
Flutes.—10, 12, 15, 18, 21, 24, 27 & 30, less discount.
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Signs, Doors, Number plates enamelled in any color and decorated in any style. Illustrated catalogue furnished on application. Plumbers' Materials, and every description of Wrought and Cast Iron Work enamelled to order.

Henry Meiggs.

The papers announce that Henry Meiggs, "the South American Railway King," has just made new contracts for public works in Peru, and some of the most remarkable projects of engineering in the world are consequently to be pushed to completion. Meiggs is one of the most interesting specimens of American enterprise in existence. His life is a romance. Thirty years ago he was a respectable citizen of New York, best known, perhaps, as a patron of music. He went to California in the early days of the gold excitement, and made a fortune there, not by digging, but by trading. He became a prosperous dealer in "lumber," having sawmills in the back country, and a large establishment in the city of San Francisco, where he was elected a member of the municipal council. Great quantities of heavy planking were used there as the city began to grow; it was employed instead of pavement, and bought for it, and the labor expended on it, the city government used to issue scrip in sums of one hundred, five hundred, one thousand and five thousand dollars. The scrip was popular; it was a favorite collateral for loans, and so the lumber-business became one of the great interests of San Francisco, and the foundation of a great many commercial fortunes. One morning, in 1854 or 1855, Meiggs was missing. He had gone aboard a schooner of his own, with his whole family, stowed the hold with every fragment of property that he could carry away, stripping even the furniture from his house and the ornaments from his parlor mantel, and, unsuspected, had dropped quietly down the bay and sailed for South America. He left behind about a million dollars of liabilities. Then it was discovered that he had made use of his position as a member of the city council to issue quantities of fraudulent scrip. The paper was adjudged a forgery, but it was not really that; it was properly signed, but dishonestly issued. There was, of course, a panic, and a series of failures, lasting two years, in the course of which all the lumber dealers in San Francisco went down.

Meanwhile the fugitive, carrying such luggage as surely no absconding bankrupt ever took with him before, was wafted gaily over summer seas, and when the world next heard of him he was one of the richest men of Peru. When Henry Meiggs first made his appearance in Peru, he was already favorably known as a contractor from having concluded important railway works in Chili, and had become naturalized in that country. The first contract in Peru was signed in 1863, under the Government of General Pedro Diez Cuseco, and was for the line from Mejia to Arequipa. In 1870 the Peruvian Congress, having approved of the emission of bonds for a loan of 300,000,000 fr., the construction of railways was commenced at once on a large scale, and Mr. Meiggs became contractor general, and having received large advances from the State, bought up for ready cash all the concessions for railroads that had already been granted. And now a somewhat similar scene occurred in Peru to that which was witnessed in England during the railway fever. Engineers sprang up on all sides; every one whose acquirements enabled him to set out a curve more or less correctly and run a level with an error that did not exceed a few yards, found employment in that capacity. Captains and mates of merchant ships were given charge of a section, and any one who wore long boots and rode on a California saddle was dubbed "el Senor Ingeniero." One of these worthies being allotted as an assistant to the chief engineer to one of the railways, was ordered by him to take some levels, and provided with an instrument for the purpose, which, however, he shortly returned, stating that "the darned thing was out of order, and showed everything upside down."

However, this sort of thing could not last, and the bogus engineers were soon weeded out and capable men put in their place; and so far from there being anything to criticize in the generality of the Peruvian railways, the wonder is how they were traced or made at all.

Every one who has visited any of the railways constructed by Mr. Meiggs must acknowledge both the perfect manner in which the work is done and the courtesy and attention shown to all visitors by Mr. Meiggs' employees, who, although of many different nationalities, are all alike on one point, and universally extend their hospitality to all who desire to inspect the works under their charge.

Mr. Meiggs paid his debts in San Francisco. He made such honest reparation for his delinquencies that the Legislature of California passed a special act to relieve him from the consequences of his wrong-doings, and if he chose to go back there now he would be received with open arms. But the tales of his fabulous wealth were greatly exaggerated, for it appears that he exhausted his money in his railway enterprises, and about a year and a half ago he was obliged to suspend the works for want of means. Now, however, he has formed a company of Americans and Peruvians to complete the undertakings; engines, wagons, and other material have been purchased in this country, and engineers and contractors are going out to Peru at once. Meiggs has already completed four railways, at a cost of about \$55,000,000, and his present plans embrace three more, all of which are under way.

Mr. Meiggs himself has a reputation in Peru for charity and generosity such as is extended to few, and wonderful stories of his liberality are related in that country. His moderate conduct while exhausting his funds during the non-payment of the large sums due to him upon his contracts by the Peruvian government, has made him many new friends in that country, who will rejoice at the prospect of the extension of the branch line from the Oroya Railway to the far-famed silver hill (Cerro de Pasco), which has now been arranged and is being proceeded with. These ancient and rich mines are now in decadence, owing to their being flooded and the miners not commanding capital enough to drain them. They therefore confine themselves to getting what ores they can above water level, and the output is in consequence very much reduced. There

have been steam pumping engines in Pasco for a long time past; indeed, Trevethick spent many years of his life there, but the body of water is too great to be dealt with in this way, and it has been determined to open a drainage tunnel which, when completed, will leave an enormous amount of ore available to repay its cost.

This is hardly a speculation; it is almost a certainty, as the ore is known to be there, and the expense of the tunnel is easily calculated. In fact, it is said there is not an atom of soil in Pasco that does not contain some silver; even the abode of which the houses are built contains 4 marks to the cajon (6000 lbs.) The construction of the branch railway will facilitate the transport of the necessary materials and tools and the employment of modern machinery and metallurgical skill and knowledge, instead of the rude Spanish *arrastras* and rule of thumb work, cannot fail to mark the commencement of a new era for this part of Peru. The government has at last agreed to Mr. Meiggs' terms for undertaking these works, and they are now being put in hand. Peru is a name that does not sound pleasantly just now among us, but the last few years have seen a wonderful advance in that country. For the last ten years there has not been a successful revolution; in many instances the people have voluntarily assembled to protect the cause of order, and habits of morality and industry are more and more the rule, and public opinion is stronger and condemn more firmly those who evince a desire to prosper at the expense of a disturbance of the government of the time. The capital has been greatly benefited by the operations of Mr. Meiggs, who, during the government of Don Jose Balta, purchased the zone of ground occupied by the ancient fortifications, and has transformed that dusty precinct into shady Alamedas, bordered on each side by most valuable building lots. He has also purchased a considerable extent of land between Lima and Callao, adjoining the new railway, and the plans are prepared, and have been on view for some time at the office of the Obeas Publicas Company, for laying this out in parks, gardens and villa residences, and so connecting the port and the capital.

Mr. Meiggs' career has been a most extraordinary one, and the claim that he scarcely has a personal enemy argues wonderful tact and temper in dealing with those who come in contact with him. We wish him every success in his new undertaking.

Bessemer Steel Ship Plates.

BOLTON, LANCASTIRE, England, May 20, 1877.
To the Secretary of the American Iron and Steel Association—SIR: We beg to thank you for the copy of the Bulletin you have been kind enough to send to us, containing an article on steel shipbuilding extracted from the London Times, and also a portion of a letter we wrote to the editor of that journal, as we considered his article was calculated to mislead the public by the implied superiority conveyed in it of steel made by the Bessemer process, more especially in reference to steel plates for shipbuilding, and also that it is entirely due to the Siemens process that the Admiralty are now enabled to supply themselves with a quality of steel specially suited to their requirements in the building of vessels of war. We may further state that we think the Times article gives an erroneous impression as to the use of steel for shipbuilding in the early days of its manufacture by the Bessemer process, as our firm commenced to manufacture steel plates for that purpose in the autumn of 1863, and in about twelve months supplied at least 1000 tons to various shipbuilders, and we have since then continued to supply it regularly for the construction of vessels where a light draught of water is an object. The vessels built of this material gave most satisfactory results, and withstood the effects of accidents in a most extraordinary manner.

In 1866 we obtained our first order from the Admiralty, and have continued to supply the government dockyards regularly since that date with steel plates and angles to be used in the construction of iron-clads.

It was specified that the steel to be used for this purpose must possess a minimum tensile strength of 33 tons and a maximum of 40 tons per square inch, but it was found that punching had so injurious an effect on steel of this strength that its use would be extremely limited unless some means could be found of overcoming this defect; this led us to make a number of experiments, and in May, 1867, we discovered that annealing the plates after punching restored the steel almost to its original strength. This fact was communicated to our government, who confirmed it by experiments which you will find in the pamphlet on the "Treatment of Steel Plates," herewith mailed you. We may here remark that we consider the use of steel for constructive purposes has been very much retarded by engineers asking for a material with too high a tensile strength, as specifications for thousands of tons have passed through our hands requiring steel plates to stand a tensile strain of 40 tons per square inch for a quarter of an hour without fracture, and for which we invariably declined to tender.

In 1875 a demand sprang up for steel for shipbuilding of so mild a quality that when struck by shot it would not star or splinter, and our firm was the first to be able to supply it. The sample plates made by the Bessemer process possessed an average tensile strength of 28 tons per square inch, with an elongation of 1½ inches in 6 inches, or over 20 per cent., and strips cut from each plate, after being made red-hot and slacked in cold water, were bent cold without showing any signs of fracture, to a curve the inner radius of which was 1½ times the thickness of the plate, and we have had thousands of plates tested in this manner by government and other inspectors without a single failure. The injury sustained by this steel in punching is also much less than the stronger steel previously alluded to, as experiments have shown.

In the paper that Mr. Riley read before the Institution of Naval Architects, in 1876, he ought to have stated that he was comparing Landore steel, made under a specification limiting the tensile strength between 26 tons and 30 tons per square inch,

with Bessemer steel made under a specification which demanded a minimum tensile strength of 33 tons, with a limit of 40 tons per square inch, and although there had been a series of tests simultaneously made on Bessemer steel supplied under the same specification as the Landore steel, and which gave in every respect at least as good results as the Landore steel, he did not refer to them. We send by book post the paper on the "Treatment of Steel Plates" and "Results of Experiments on Riveted Joints and Steel Plates," which we think may be of interest. We are, sir, yours, very truly,
THE BOLTON IRON AND STEEL COMPANY, LIMITED, per HENRY SHARP, General Manager.

Resolutions of Sympathy.

At a meeting of the Table Cutlery Manufacturers' Association, held at Beaver Falls, Pa., June 26th and 27th, the secretary was instructed to forward to the family of the deceased, and to have published in *The Iron Age* and in the *Manufacturer*, a copy of the following paper:

Whereas, It has pleased our Heavenly Father in His wise Providence to remove from this world a very highly esteemed member of this Association, Mr. Joseph B. Beadle, a man whose record amongst men was faultless, and whose Christian character was such as to prompt to a better and purer life those with whom he was brought in contact, who, suffering for years from an incurable disease, accepted with cheerful resignation the chastening hand of a loving Father; therefore,

Resolved, That the members of this Association, recognizing the worth of so valued an associate, and deeply feeling the loss we have sustained in his death, hereby express our admiration of his Christian character and our appreciation of his worthy example; and that we hereby tender to his widow and family the assurances of our sincere sympathy in their great affliction.
R. H. JOHNSON, Secretary.

The Pennsylvania Railroad.—Meeting of English Stockholders.—The London Times contains a full report of the proceedings of the meeting held in London, June 15, of English shareholders of the Pennsylvania Railroad, at which Mr. Edmund Smith, second vice-president, made a statement of the company's affairs, and a resolution was passed asking for fuller statements of its accounts, and appointing a committee to confer with the Board of Directors on the subject. The Times, commenting upon the meeting, says: Some important statements, calculated to reassure the public, were made to-day at the meeting of Pennsylvania Railroad shareholders by Mr. Edmund Smith, vice-president of the company. What will satisfy them most, perhaps, is his assurance that it is no part of his business here to try and raise more money for the line. A rumor to that effect had been rather prominently circulated and was causing some uneasiness, for nothing could well be more inopportune than such an attempt just now. Another satisfactory feature was the willingness shown by Mr. Smith to entertain the propositions made by the English shareholders relative to traffic statements and fuller accounts. Nothing will conduce more to sustain the credit of American railways than periodical statements of income and expenditure and annual or semi-annual accounts and balance sheets drawn up on English models. There must be an end of subsidiary companies used as mere receptacles of the waste matter produced by inordinate railway competition. Everything ought in future to be made plain to the most ordinary understanding.

The Athens correspondent of the *Deutsche Industrie Zeitung* writes that the manufacture of iron, which was begun a few years ago by a metallurgical association in Athens, has been abandoned because of the scarcity of stonecoal, although brown coal is abundant in Greece. The writer suggests that German iron makers could purchase iron ore in the island of Seriphos at very low prices. These ores are brown hematite, red hematite and specular ore, which can and will yield 25 to 30 per cent. of metallic iron. These beautiful ores can be bought for ten francs (\$2) per ton. One deposit of these ores is calculated at 500,000 tons, and the island thus rich in iron ore has been named "Sidera Nesos," or Iron Island.

From the Bloomfield mines, in Bedford and Blair counties, and which belong to the Duncan estate, the Pennsylvania Railroad, during the month of May, shipped 7,436,050 pounds of iron ore. These ores are employed in the manufacture of Bessemer steel, and during the rebellion were used in making the famous Rodman guns. The Pennsylvania Railroad is fostering these mines, which owe their development to the industry and business foresight of Major John W. Duncan, of Pittsburgh. Recently a number of improved washers have been introduced that will increase the production of ore more than one-half.

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Important to Manufacturers.

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Auctioneers and Commission Merchants, No. 15 Murray St., New York.
Solicit from Manufacturers and others consignments of Hardware and Cutlery for our weekly Auction Sales to the Trade, or at private sale for cash, as desired. Our facilities for moving large loads of goods are unsurpassed. Advances made if desired.

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The TRENTON VISE & TOOL WORKS, Trenton, N. J., having increased their facilities, are now able to do all kinds of
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in quantities to order at reasonable rates.

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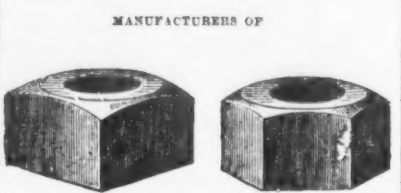
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The advantages gained by using Ramsey's Car Truck Shifting Apparatus, are as follows:
1st.—The power required to run a car on the level track is sufficient to separate the trucks from a car body.
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3d.—The manufacturing cost of this Shifting Apparatus will not exceed one hundred dollars. And each one is capable of doing more work with less strain to the car, and without the assistance of an extra Steam Engine, than a Steam Hoist, costing twelve thousand dollars.

At each one of the principal stations where car wheels are regularly tested to see how they stand the journey, a switch is placed, having a depression or pit about eighteen inches deep, with gentle inclines at each end, and on each side a narrow track, remaining on the level, upon which is small but strong trucks, designed to carry supporting beams or cross-bars extending from one to the other across the pit, for the purpose of bearing the car body, while the trucks run down the incline rails to the pit.
A Working Model of this Apparatus is on exhibition at
220 S. Fourth Street, Philadelphia, Pa.

Communications may be addressed to
RAMSEY & SCARLETT, as above, or to
Box 162, Cobourg, Ontario, Canada.
See *The Iron Age* of Sept. 7, 1876.

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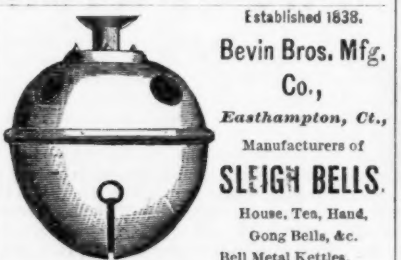


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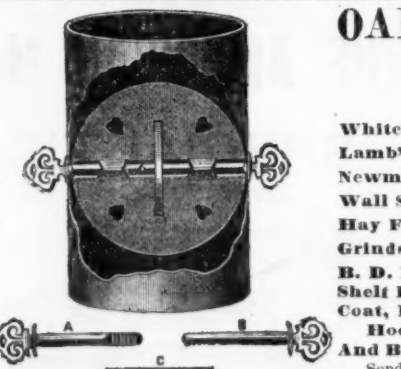
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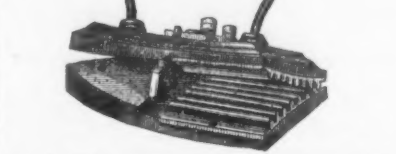
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1st. It can be used as an ordinary Smoothing Iron. 2d. It is a fluting Machine as well as a Smoothing Iron. 3d. The Fluting Attachment being made of brass and convex in form, it has all the advantages of the crank machine. 4th. It combines the two articles in one, taking up the room of but one machine, and is always ready for use.

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No. 82 John Street, New York.

PYROMETERS for BLAST FURNACES.

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ALSO FOR SALE
PYROMETERS
For Baker's Ovens, Boiler Flues, Galvanizing Baths, Oil Stills, Vulcanizers, Superheated Steam.
Over 400 "Gauntlett" and 150 Portable Pyrometers are now in use at Blast Furnaces.
E. Brown's Portable Blast Gauge for the plug hole, Steam Gauges, Blast Gauges, Mercury Gauges, Recording Steam Gauges, Engine Counters, Indicators for ascertaining the Horse Power.

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REVOLUTION INDICATORS.
which constantly indicate without the use of a watch, the number of turns per minute made by a Steam Engine
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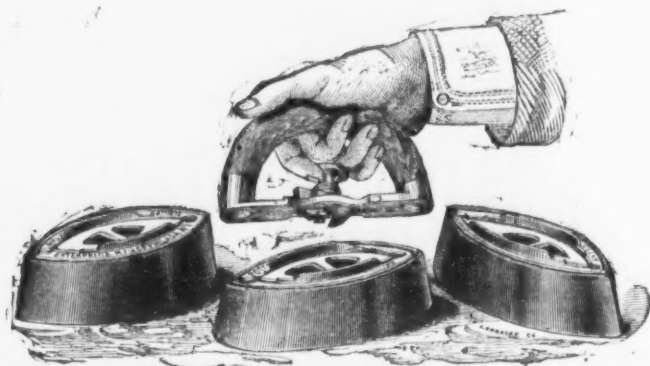
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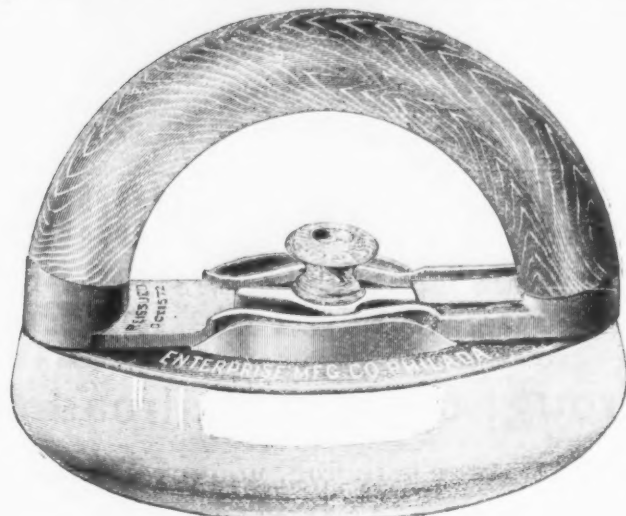
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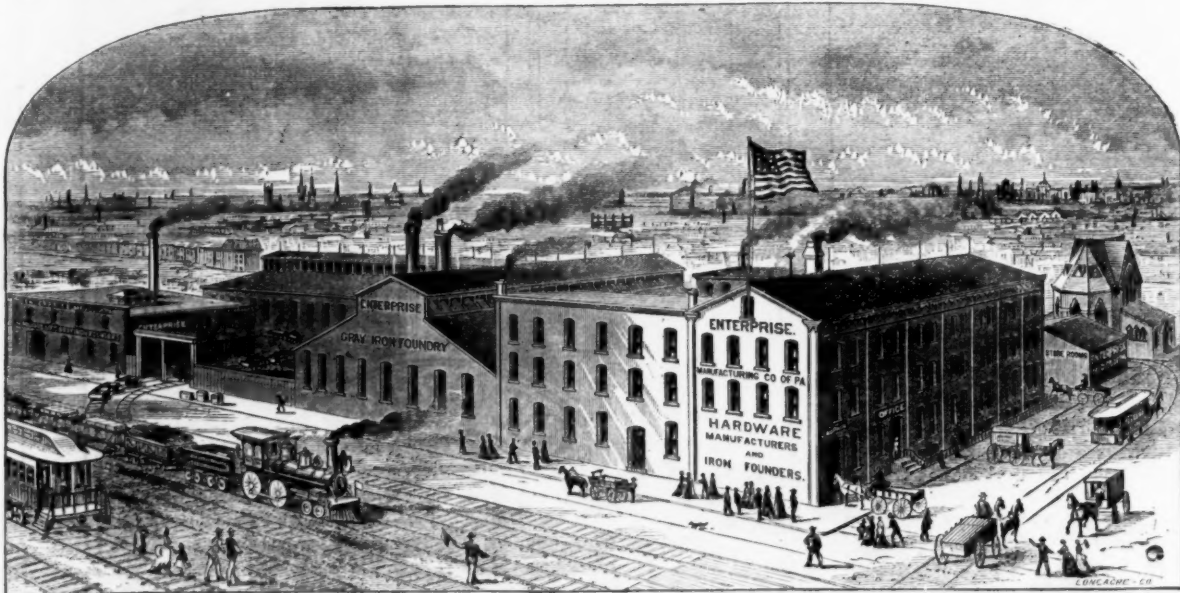
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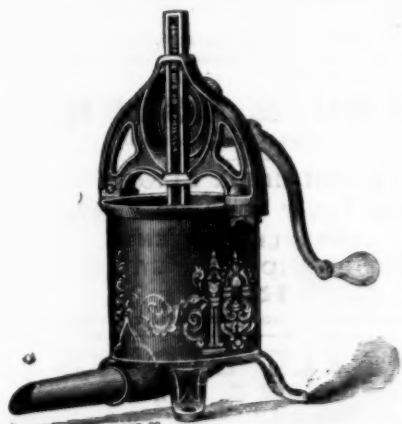
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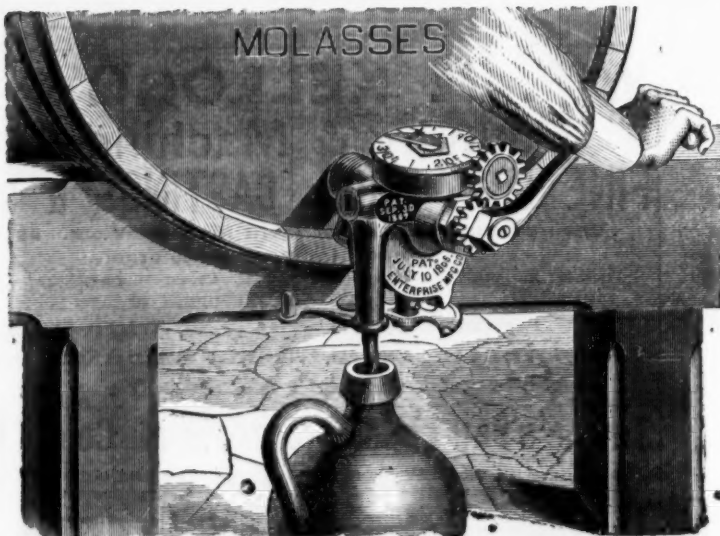
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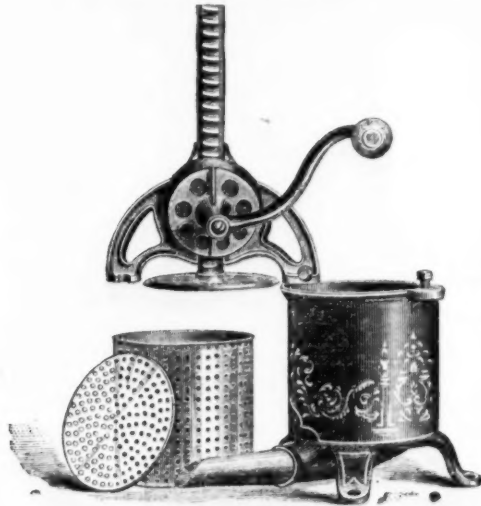
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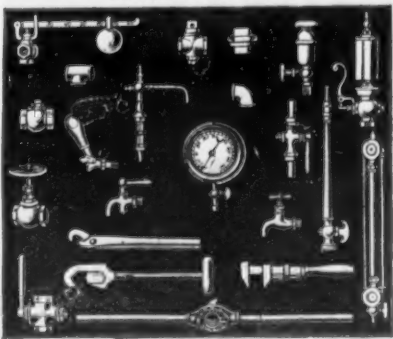
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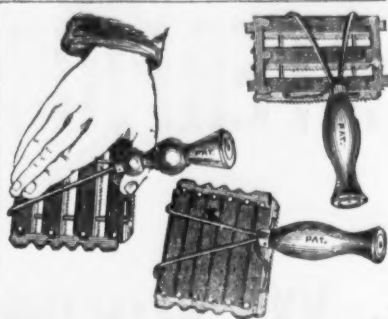
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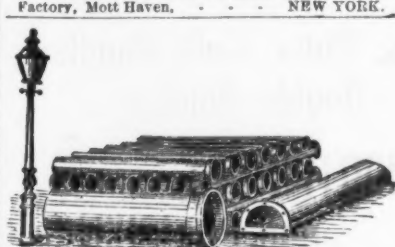
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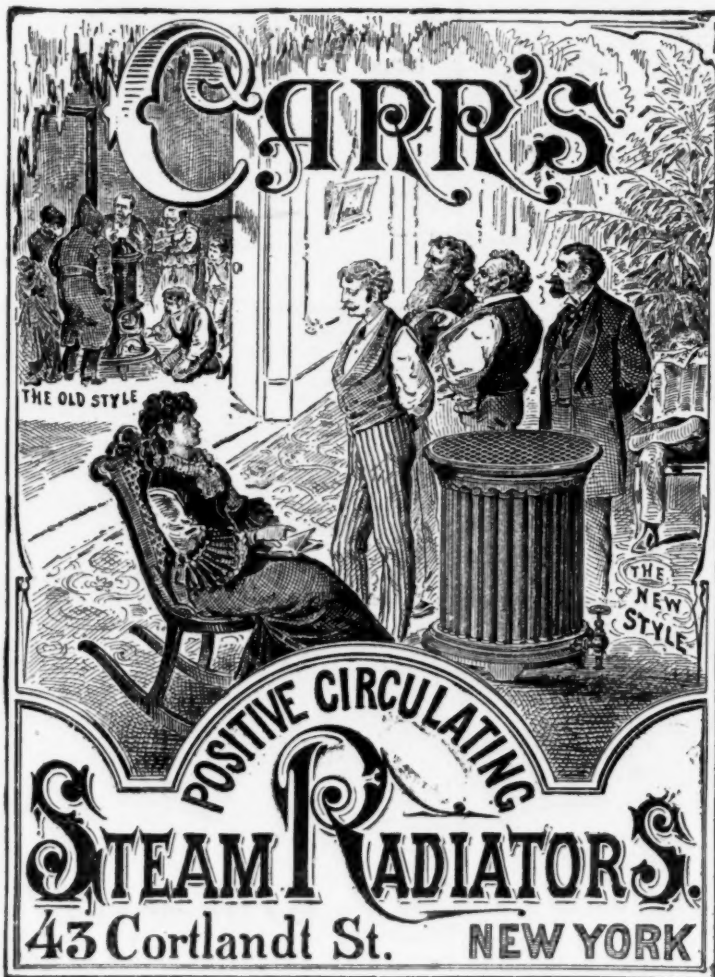
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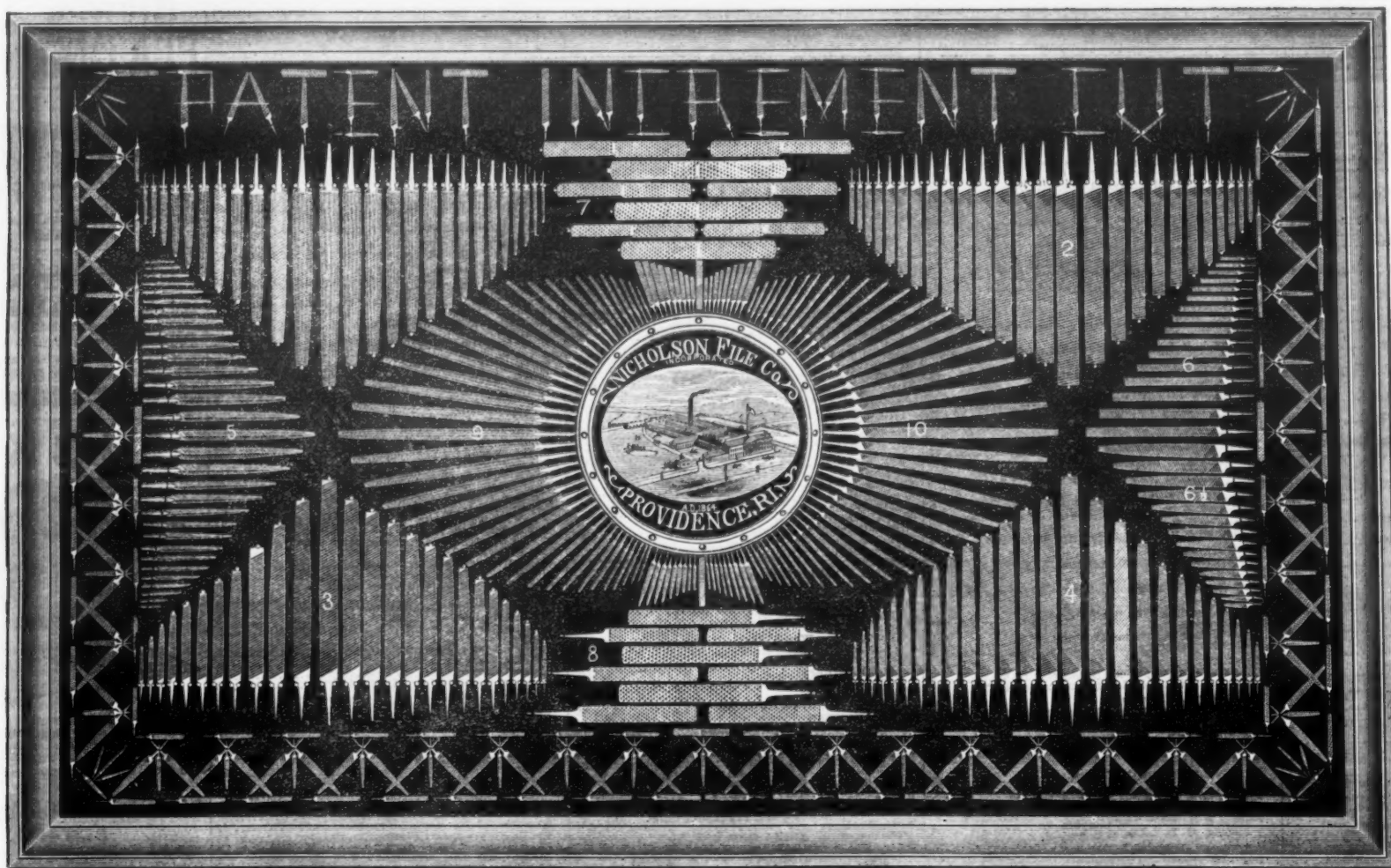
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Engravers, Steam, Makers of.	Harford Foundry and Machine Co., Harford, Ct.	42
Engravers, Steam, Makers of.	Leveque & Co., 125 South 4th, Phila.	42
Engravers, Steam, Makers of.	Payne B. W. & Sons, Corning, N. Y.	42
Engravers, Steam, Makers of.	Shapley & Wells, Birmingham, N. Y.	42
Engravers, Steam, Makers of.	Snyder Ward B., 91 Fulton, N. Y.	42
Engravers, Steam, Makers of.	Taylor Mfg. Co., Westminster, Md.	44
Engravers.	Collins Geo. B., 81 Reade, N. Y.	27
Engravers.	McNab & Hartin Mfg. Co., 36 John, N. Y.	30
Engravers, Self-Measuring, Makers of.	Kanter Mfg. Co., of Pa., Phila. and N. Y.	29
Ford Cutters.	Stiver & Jennings Mfg. Co., Salem, O.	41
Fires, Importers.	Carr J. & Riley, 82 John, N. Y.	38
Fires, Importers.	Flaet Joseph S., 411 Commerce, Phila.	11
Fires, Importers.	Fraser & Co., 30 Fulton, N. Y.	38
Fires, Importers.	Moss F. W. & John, N. Y.	38
Fires, Importers.	Sanderson Bros., 106 Cliff, N. Y.	38
Fires, Manufacturers of.	American Fire Co., Pawtucket, R. I.	8
Fires, Manufacturers of.	Autumn Fire Works, 29 Chambers, N. Y.	8
Fires, Manufacturers of.	Barnett & H. A. and 43 Richmond, Phila.	8
Fires, Manufacturers of.	Draper C. F. & Co., Sing Sing, N. Y.	8
Fires, Manufacturers of.	Everhart James M., Scranton, Pa.	46
Fires, Manufacturers of.	Heller & Bros., Newark, N. J.	46
Fires, Manufacturers of.	Heller & Bros., Newark, N. J.	46
Fires, Manufacturers of.	Jewitt Thos. & Sons, Sheffield, Mass.	46
Fires, Manufacturers of.	McAuffrey & Bro., 112 and 134 N. 4th, Phila.	46
Fires, Manufacturers of.	Nicholson File Co., New York, N. Y.	46
Fires, Manufacturers of.	Paul Chas. B., Williamsburg, N. Y.	46
Fires, Manufacturers of.	Rothers John & Wm., Matamoras, N. Y.	46
Fire Brick, Makers of.	Brooklyn Clay Works and Fire Brick Works, Van Dyke St., Brooklyn, N. Y.	27
Fire Brick, Makers of.	Evans & Howard, St. Louis, Mo.	27
Fire Brick, Makers of.	Gardner, Stuart & Co., Pittsburgh, Pa.	27
Fire Brick, Makers of.	Hall A. & Sons, Perth Amboy, N. J.	27
Fire Brick, Makers of.	Hall A. & Sons, Buffalo, N. Y.	27
Fire Brick, Makers of.	Maurer Henry, 418 East 2d, N. Y.	27
Fire Brick, Makers of.	Kreischer H. & Son, 55 Goerck, N. Y.	27
Fire Brick, Makers of.	Newton & Co., Albany, N. Y.	27
Fire Brick, Makers of.	Ostrander James & Son, Troy, N. Y.	27
Fire Brick, Makers of.	Valentine M. D. & Bro., Woodbridge, N. Y.	27
Fire Brick, Makers of.	Watson John R., Perth Amboy, N. J.	27
Fire Brick, Makers of.	Weber Adam, 583 E. 15th, N. Y.	27
Fire Escapes.	Falk L., 165th, N. Y.	27
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Flint and Emery Paper and Cloths.	Murray & Adams & Co., 730 Market, Phila.	36
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Fluting Machines.	The American Mfg. Co., Philadelphia, Pa.	27
Fluting Machines.	Weeks A. A., 82 John, N. Y.	27
Forges, Portable, etc.	Keystone Portable Forge Co., Philadelphia, Pa.	44
Founders and Machinists.	Sam'l J. Crosswell Jr., 512 Reade, Phila.	6
Foundry Facing.	Faxon J. W. & Co., 514 Beach, Phila.	4
Foundry Facing.	Whitehead Bros., 517 W. 15th, N. Y.	4
Galvanized Iron.	Lefferts Marshall Jr., 90 Beekman, N. Y.	4
Glass Signs.	Otto Steitz, N. Y. Glass Letter Co., 611 B'way, N. Y.	36
Grindstones.	Junius Johnson & Son, Rochester, N. Y.	44
Grindstones.	Worthington & Sons, North Amherst, O.	39
Guns, etc.	Moore's John F. Sons, 300 Broadway, N. Y.	6
Guns, etc.	Winchell Iron Works, 100 Reade, N. Y.	25
Gasworks.	Kneeland F. L. (Dumont), 70 Wall, N. Y.	38
Gasworks.	Lafin & Rand Powder Co., 28 Murray, N. Y.	38
Hammers, etc., Manufacturers of.	Harvey H. H., Augusta, Me.	42
Hammers, etc., Manufacturers of.	N. Carolina Hammers Co., 78 Reade, N. Y.	40
Hardware Commission Merchants.	Budin Philip S., 10 Chambers, N. Y.	4
Hardware Commission Merchants.	Granam & Haime, 115 Chambers, N. Y.	4
Hardware Commission Merchants.	Heaton & Denckla, Philadelphia, Pa.	4
Hardware Commission Merchants.	Walbridge G. B. & Co., 83 Reade, N. Y.	35
Hardware Dealers.	Barber W. C. & Co., Chicago, Ill.	12
Hardware Dealers.	Lloyd, Supple & Walton, 625 Market, Phila.	12
Hardware Dealers.	Proddy Hardware & Mfg. Co., 50 Beekman, N. Y.	36
Hardware Dealers.	Quackenbush, Townsend & Co., 59 Reade, N. Y.	39
Hardware Dealers.	Shepard Sidney & Co., Buffalo, N. Y.	49
Hardware Importers.	Baker Hermann & Co., 101 Duane, N. Y.	39
Hardware Importers.	King, Briggs & Co., 50 Chambers, N. Y.	11
Hardware Importers.	Van Wagoner & Williams, 82 Beekman, N. Y.	46
Hardware Importers.	Harr. J. F. W., 78 Chambers, N. Y.	11
Hardware Importers.	Widener Louis & Co., 30 Reade, N. Y.	11
Hardware Manufacturers.	American Spiral Spring Butt Co., 82 Beekman, N. Y.	46
Hardware Manufacturers.	Blake Bros. Hardware Co., New Haven, Conn.	39
Hardware Manufacturers.	Corbin P. & F. New Britain, Conn.	40
Hardware Manufacturers.	Coville Hardware Co., Unionville, Ct.	45
Hardware Manufacturers.	Enterprise Mfg. Co., Phila.	29
Hardware Manufacturers.	Miller & Fells Mfg. Co., 34 Chambers, N. Y.	29
Hardware Manufacturers.	Pearl & Galt Mfg. Co., Cincinnati, O.	4
Hardware Manufacturers.	Pat & Co., Buffalo, N. Y.	11
Hardware Manufacturers.	Providence Tool Co., Providence, R. I.	11
Hardware Manufacturers.	Russell & Erwin Mfg. Co., New York, N. Y.	10
Hardware Manufacturers.	Union Amherst Co., Chambers, N. Y.	10
Hardware Manufacturers.	Van Wagoner & Williams, 82 Beekman, N. Y.	46
Hardware Manufacturers.	Wilson Mfg. Co., New London, Conn.	6
Hardware Specialties.	Grant & Co., Phila.	4
Hardware Specialties.	Jesup & Sterling, 7 and 9 Cliff, N. Y.	4
Hardware Specialties.	Perin & Galt Mfg. Co., Cincinnati, O.	4
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Hardware Specialties.	Shiner Shepard & Co., Buffalo, N. Y.	11
Hardware Specialties.	Spencer & Underhill, 91 Chambers, N. Y.	4
Hinges.	Lewis, Oliver & Phillips, Pittsburgh, Pa.	13
Hoisting Engines, Makers of.	Crane Bros. Mfg. Co., Chicago, Ill.	9
Hoisting Engines, Makers of.	Mundy J. S., Newark, N. J.	44
Horse Nails, Makers of.	Amable Horse Nail Co., 25 Chambers, N. Y.	8
Horse Nails, Makers of.	Globe Nail Co., Boston, Mass.	39
Horse Nails, Makers of.	National Horse Nail Co., Vergennes, Vt.	28

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Providence, R. I.



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2.—Hand.
3.—Mill.

4.—Flat.
5.—Triangular.
6.—Pillar.

6½.—Knife.
7.—Plain Rasps.
8.—Tanged Rasps.

9.—Round.
10.—Square.
11.—Borders.

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35c	Dryer, Patent, Am's
35c	" " English
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15c	Frostings
15c	Gilt, White
15c	" Sheet
15c	Glaziers' Points
15c	Gum, Copal
15c	" Dalmar
15c	Glaze, Enamel	.....	.....	.....	.....
15c	" " dark	.....	.....	.....	.....
10c	Litnarge
10c	Pumice Stone, powdered
10c	Putty in bladders
10c	" " powdered
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15c	Spirits Turpentine
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15c	11 x 14 to 16 x 24.	10 50	7 75	6 25	6 15
15c	14 x 22 to 20 x 30.	10 75	7 50	6 25	6 15
15c	15 x 30 to 24 x 36.	12 25	10 25	9 00	7 75
25c	22 x 36 to 24 x 36.	13 00	11 50	9 75	7 75
25c	26 x 30 to 36 x 48.	14 00	12 25	10 00	9 00
25c	36 x 46 to 36 x 54.	15 00	14 00	11 25	10 00
30c	30 x 51 to 36 x 54.	16 00	14 50	12 00	11 00
30c	30 x 51 to 36 x 60.	17 00	15 25	12 25	11 25
30c	34 x 58 to 36 x 60.	18 75	17 25	15 00	13 75
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36	6 x 8 to 10 x 15.....	\$12 00	\$11 00	\$10 00	\$ 9 25
90C	11 x 14 to 16 x 24.....	17 25	12 50	11 75	10 50
1 00	15 x 22 to 18 x 30.....	17 25	16 75	15 00	
1 60	15 x 30 to 24 x 30.....	19 75	17 25	14 50	
1 75	20 x 28 to 24 x 36.....	21 00	18 50	15 75	
90C	25 x 38 to 35 x 48.....	28 75	21 25	17 50	
1 00	35 x 48 to 30 x 50.....	24 00	20 25	18 00	
1 75	30 x 52 to 30 x 54.....	25 75	23 25	19 25	
90C	30 x 54 to 34 x 56.....	27 75	25 00	21 75	
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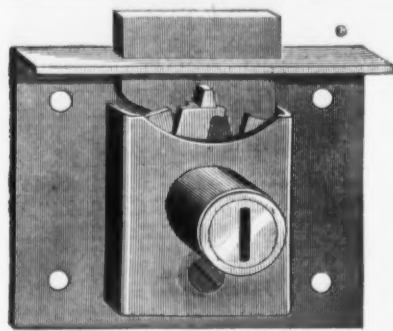
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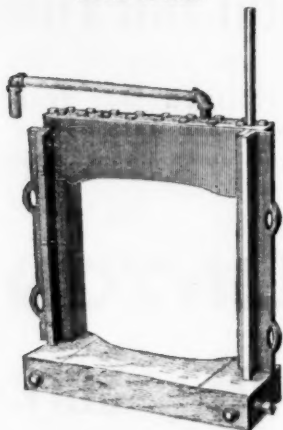
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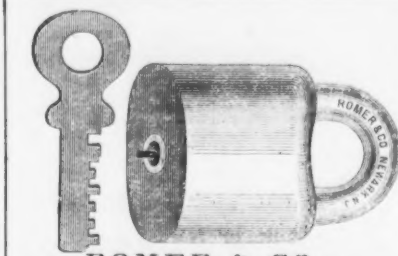
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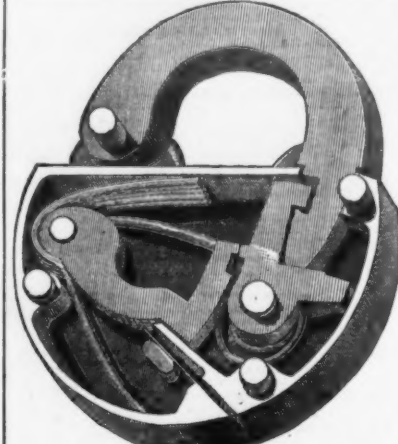
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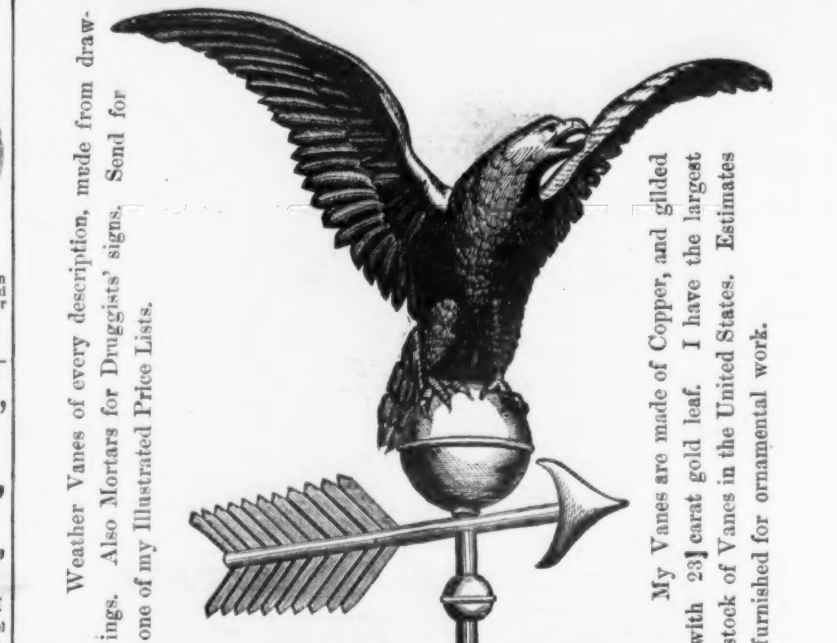
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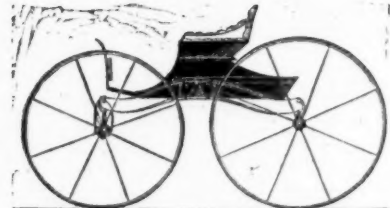
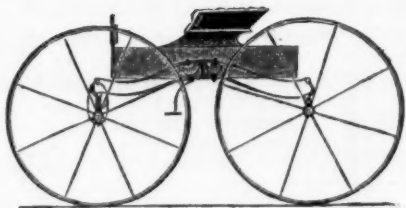
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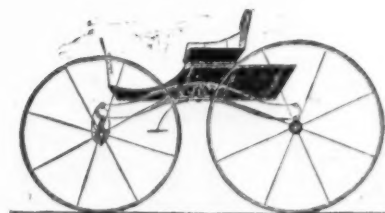
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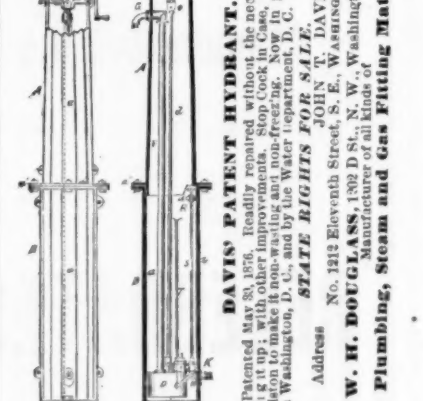
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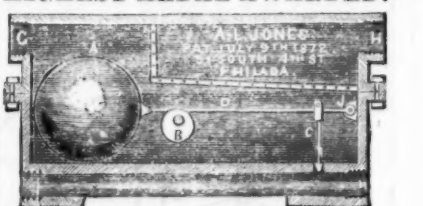
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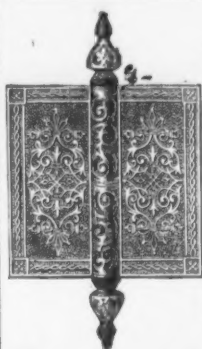
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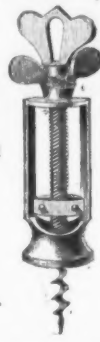
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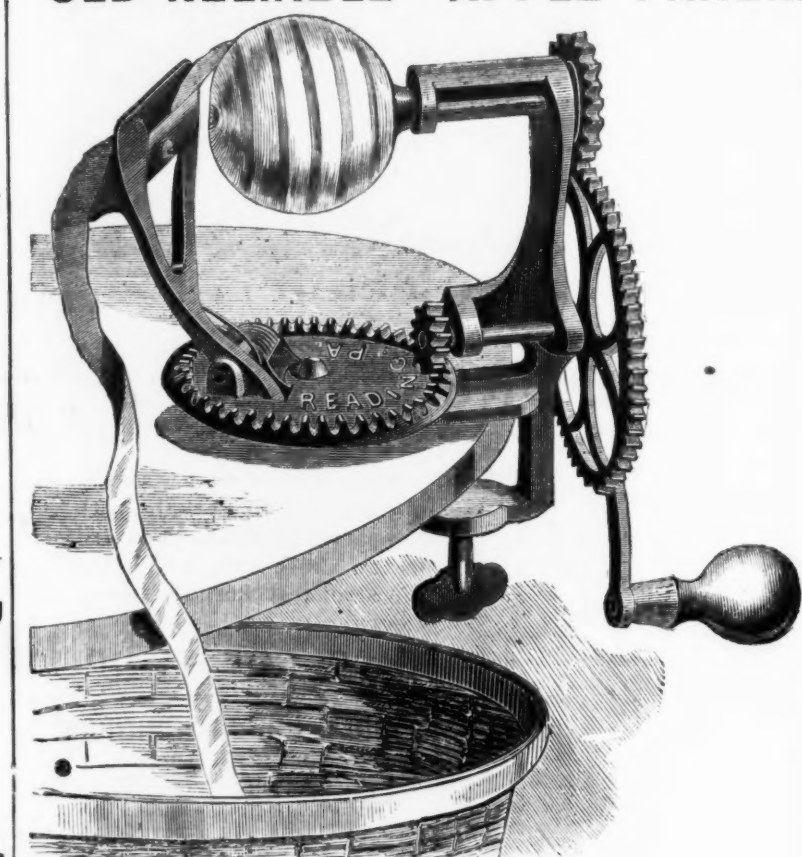
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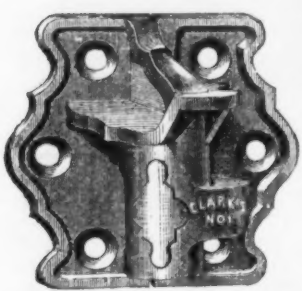
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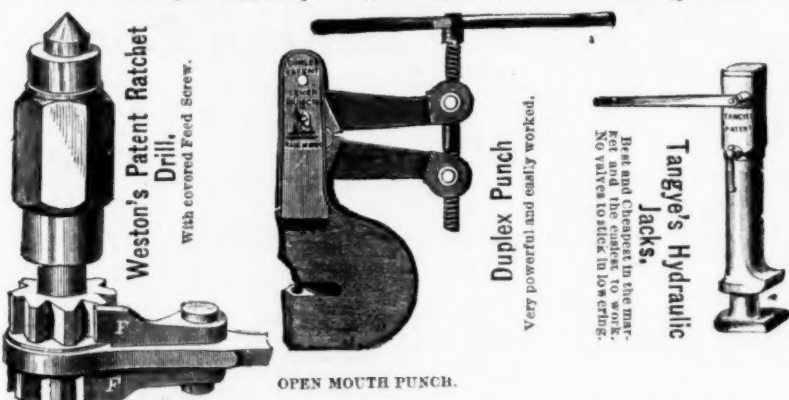
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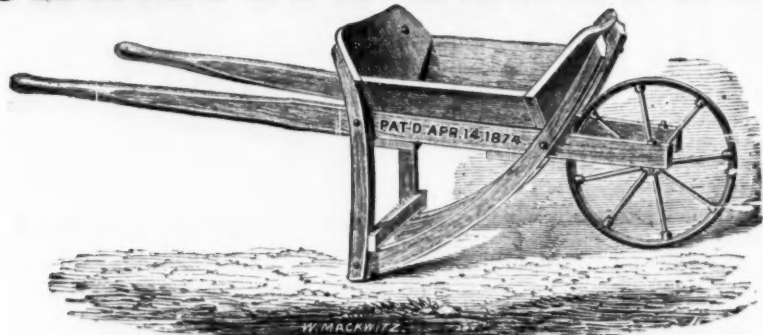
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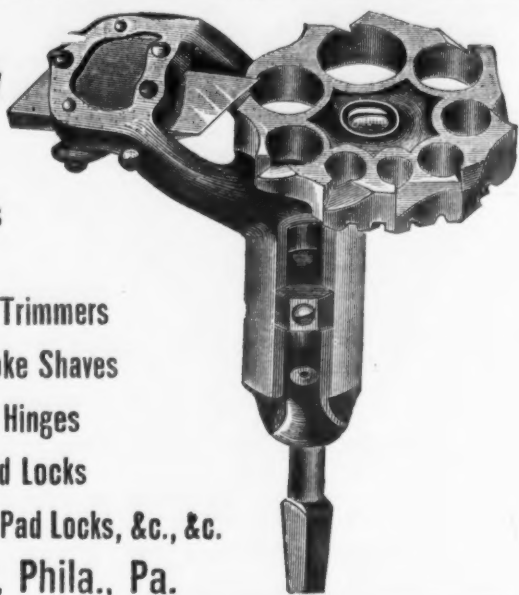
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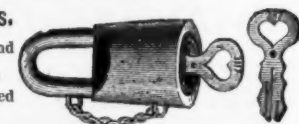
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B. Front band.

C. Nut which screws on to box

D. and confines box D and band

E to the hub.

F. Box and back band in one

piece.

G. Axle.

H. Wrench in place on back

nut.

I. Axle with back nut un-

screwed from box, and both

slipped from the collar, showing

leather washer each side of

collar, and front band in place.

Points of Excellence.

No oil can come in contact

with the wood of the hub.

No oil can escape.

No dirt, gravel or water can

work.

It holds the wheel in a superior

manner. It is easier to oil than

a common axle. It is adapted to

any kind of a wheel. It requires

no wedging to box the wheel. It

will run 500 to 1000 miles

at a single oiling.

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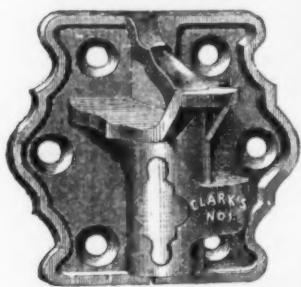
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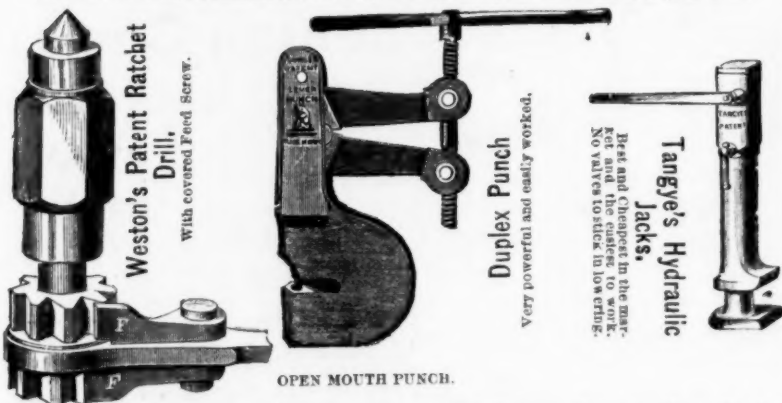
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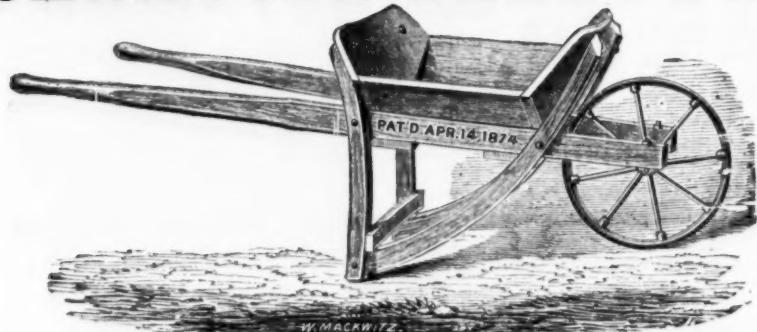
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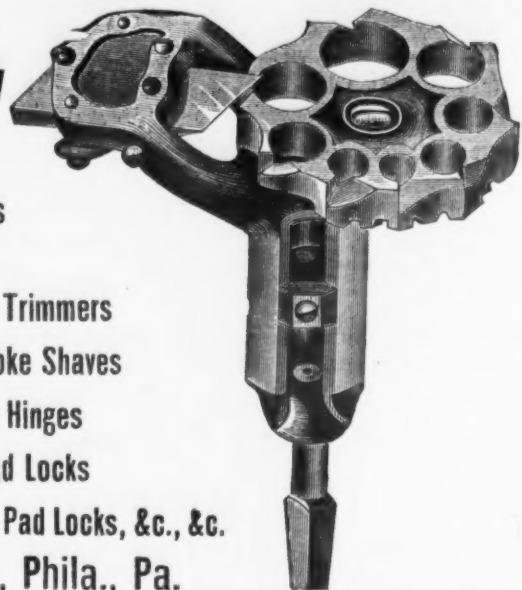
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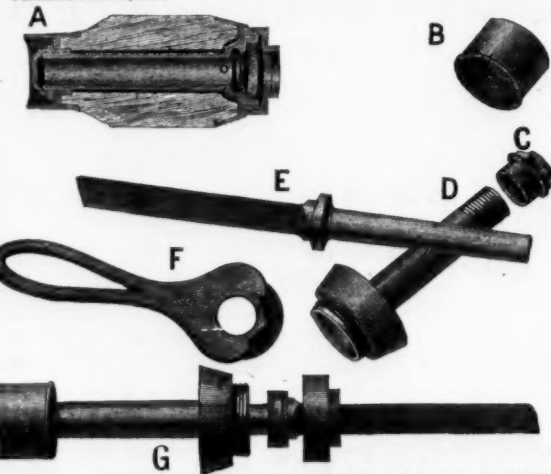
Patented June 13, 1876

DESCRIPTION,

A. Section of hub complete, showing oil-chamber.
B. Front band.
C. Nut which screws on to box D. and confines box D and band B to the hub.
D. Box and back band in one piece.
E. Axle.
F. Wrench in place on back nut.
G. Axle with back nut unscrewed from box, and both slipped from the collar, showing leather washer each side of collar, and front band in place.

Points of Excellence.

No oil can come in contact with the wood of the hub.
No oil can escape.
No dirt, gravel or water can work.
It holds the wheel in a superior manner. It is easier to oil than a common axle. It is adapted to any kind of a wheel. It requires no wedging to box the wheel. It will run 500 to 1000 miles at a single oiling.

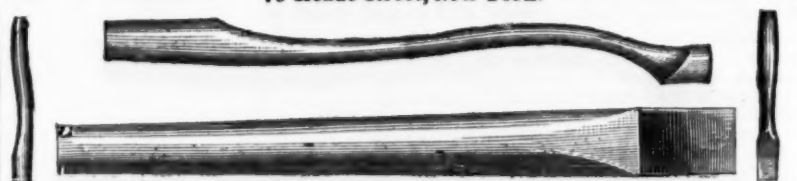


77 In ordering, give size of axle wanted, diameter of front band, and diameter of hub.
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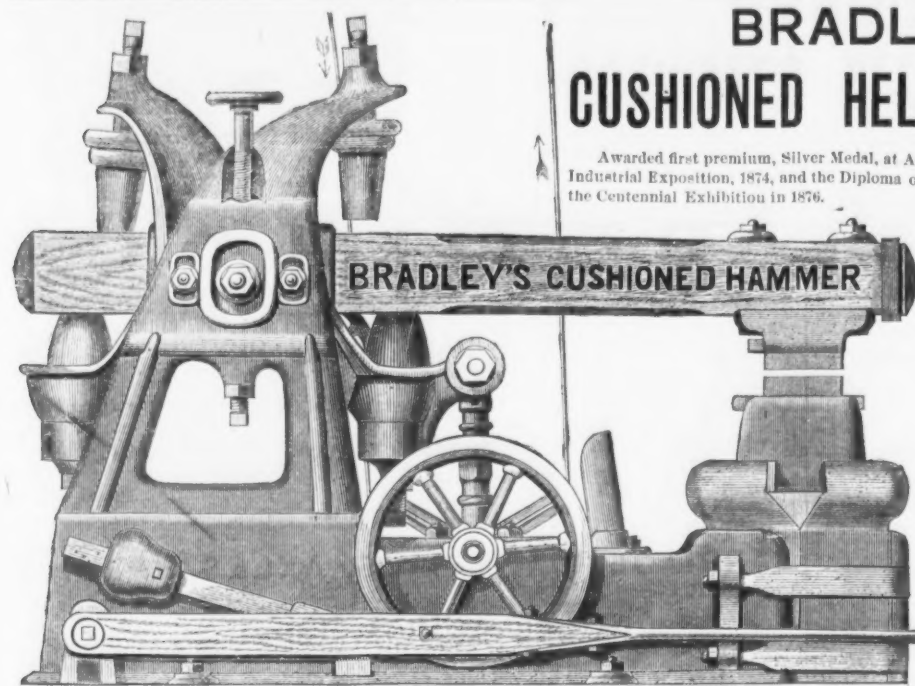
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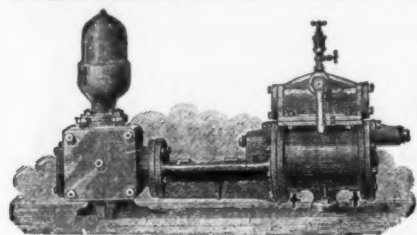
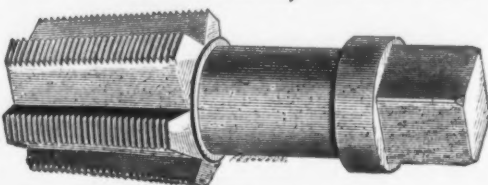
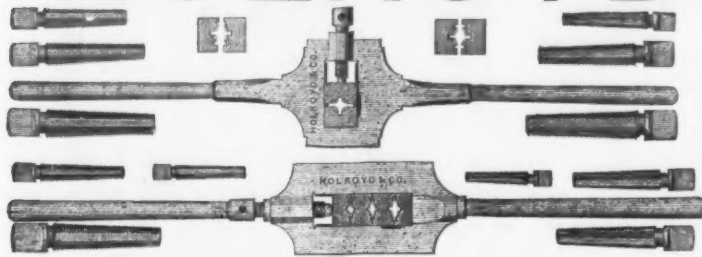
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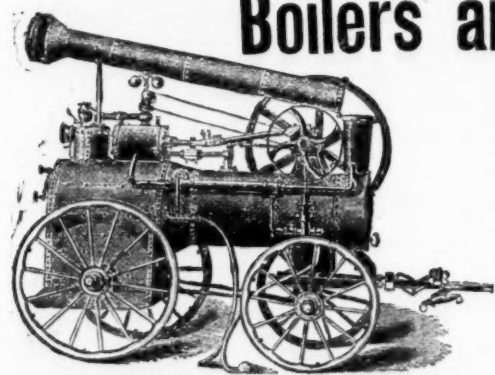
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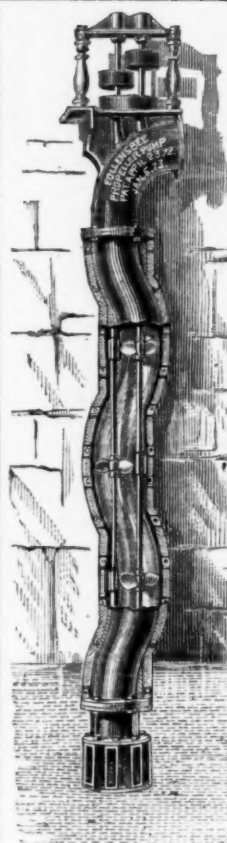
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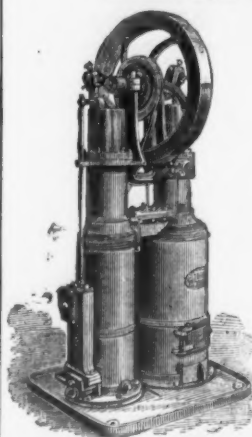
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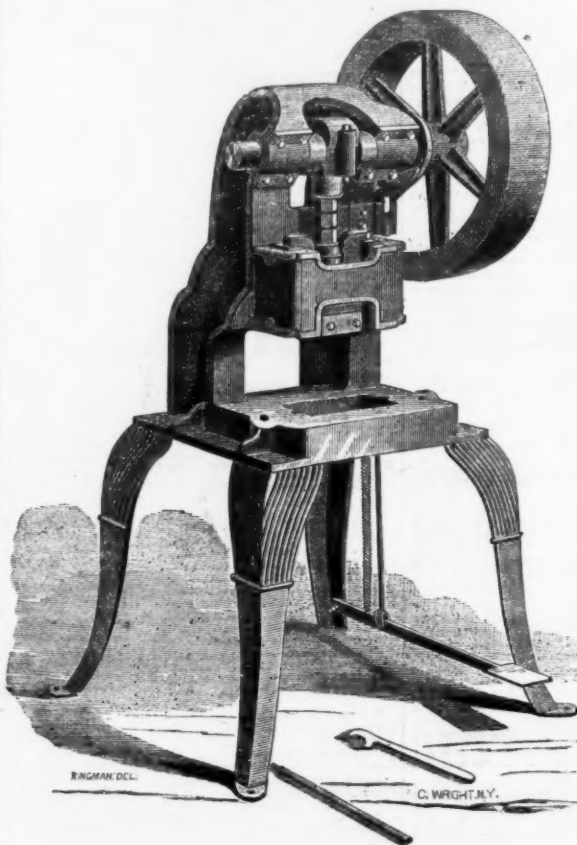


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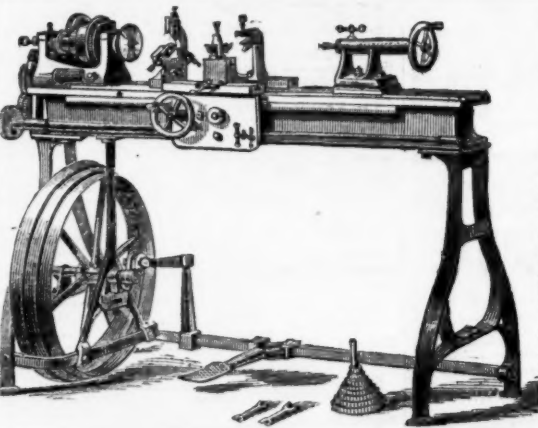
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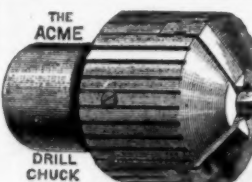


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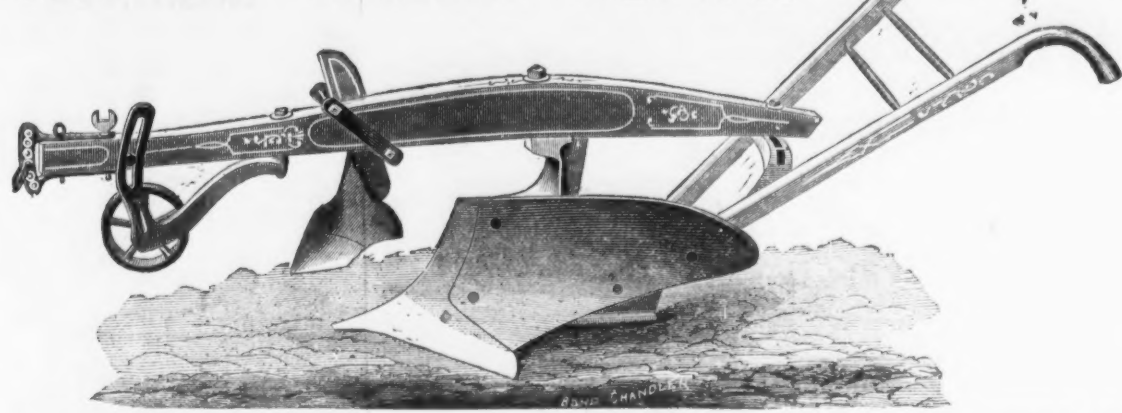
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Crow Bars. —Steel Pointed, \$1.00 to \$2.00 "Crow Bars," \$1.00 to \$2.00 "Crow Bars," \$1.00 to \$2.00	Drum Saws. —Steel Pointed, \$1.00 to \$2.00 "Drum Saws," \$1.00 to \$2.00 "Drum Saws," \$1.00 to \$2.00
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THE JUDSON GOVERNOR.

It is a common method to advertise Governors without cost, unless satisfactory to the customer, and then charge High Prices for doing what any good Governor will do. Various Governors inferior to the "Judson" are sold in this way, operating well enough for three months, to lure collection of the pay, but becoming useless after a year's wear—their construction lacking durability. The Judson Governor is guaranteed to be not only the best Regulator of Steam Engines, but also the most durable Governor made. Parties buying other Governors should stipulate that their durability be guaranteed, and should also take care that they do not for much inferior Governors, pay higher prices than those shown in the accompanying list. We guarantee the Judson Governor will do all any other Governor can do, and in Accuracy and Durability—the main essentials—we guarantee it shall do more.

Reduced Price List,

FEBRUARY 1, 1877.

For dimensions of Governor, see Illustrated Price List.



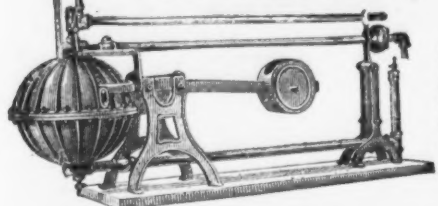
THE JUDSON PATENT Improved Steam Governor.

No Charge for Box and Carriage.

JUNIOUS JUDSON & SON, Rochester, N. Y.

Size, Inchs.	Plain.	Bright, Inchs.	Extra, Inchs.	Stop Valve.
1	\$16 00	\$18 00	\$19 00	..
1 1/2	18 00	20 00	21 00	35 00
2	21 00	23 00	24 00	40 00
2 1/2	23 00	25 00	26 00	45 00
3	26 00	28 00	29 00	50 00
3 1/2	31 00	33 00	34 00	55 00
4	36 00	38 00	39 00	60 00
4 1/2	40 00	42 00	43 00	65 00
5	45 00	47 00	48 00	70 00
5 1/2	50 00	52 00	53 00	75 00
6	55 00	57 00	58 00	80 00
6 1/2	59 00	61 00	62 00	85 00
7	63 00	65 00	66 00	90 00
7 1/2	67 00	69 00	70 00	95 00
8	71 00	73 00	74 00	100 00
8 1/2	75 00	77 00	78 00	105 00
9	79 00	81 00	82 00	110 00
9 1/2	83 00	85 00	86 00	115 00
10	87 00	89 00	90 00	120 00

The Albany Steam Trap.



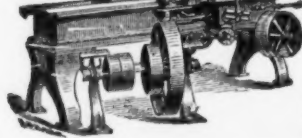
This Trap automatically drains the water of condensation from Heating Coils, and returns the same to the Boiler whether the Coils are above or below the water level in Boiler, thus doing away with pumps and other mechanical devices for such purposes. Apply to

Albany Steam Trap Company, Albany, N. Y.

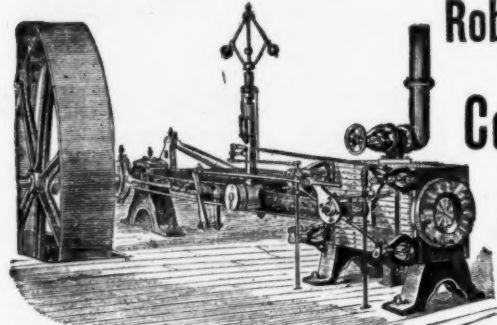
The Pratt & Whitney Co., Hartford, Conn.,

Have constantly on hand and making

Drop Hammers



Of recently Improved Construction. Pony Trip Hammers, Blacksmiths' Sheaves, Broaching and Stamping Presses, Iron Shop Cranes, Machinists' Tools, Gun and Sewing Machine Machinery. Make to order Gray and Charcoal Iron Castings of all styles and sizes not exceeding 15 tons weight, (making patterns if desired). Furnish Clamp Pulleys of light patterns, cut gears in a superior manner, &c., &c.



Robt. Wetherill & Co CHESTER, PA.

Corliss Engine BUILDERS.

Shafting & Gearing. Boiler Makers.

R. S. NEWBOLD & SON, Eagle Works.

Norristown, Pa.

IMPROVED ROTARY SHEARS, Rolling Mill, Blast Furnace, Flour Mill, Mining and Water Works Machinery, Air Compressors, Ore Washers and Brick Machines.

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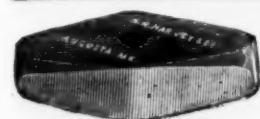
Rotary Shears for Plates & Circles.
A. Wood & Co., Conshohocken, Pa.
Ernst Stridsberg, Sweden.
Lewis Ditzel & Co., Pittsburgh, Pa.
H. A. Beale & Co., Parkersburg, Pa.
Rolling Mill & Blast Furnace Plants & Engines.
Merion Furnaces, Conshohocken, Pa.
Zurora Furnace, Wrightsville, Pa.
Clove Spring Iron Works, New York.
Norristown Water Co.
Oliver & Co., Easton Sheet Mill.
Potomac Iron Co., Plate Mill.
Parkersburg Fine Mill.
Morris, Tasker & Co., Engines.

Durand & Marais' French Pat. Brick Machine.
For Brick Yards and Fire brick Works, makes 10,000 superior bricks per day with two horse-power. In use at Brooklyn brick works, Lynchburg, Va.; F. W. Kickbusch, Waukegan, Wis.; Chetnam Fire Brick Works, St. Louis, Mo. Can hack bricks 12 high at once. The best, simplest and cheapest machine made.

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PORTABLE DRILLS. Driven by power in any direction.
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MULTIPLE DRILLS. 2 to 20 Spindles.
HORIZONTAL BORING AND DRILLING MACHINES.
HAND DRILLS. CAR BOX DRILLS.
SPECIAL DRILLS. For Special Work.

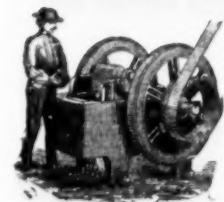


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SPECIALTIES.—Stone Cutters' Hammers and Tools, Quarrymen's Drills, Wedges and Half Rounds, &c., &c., &c. Miners' Hammers and Tools, Blacksmiths' Hammers and Tools, Patent Hammers for picking burr stone. Also the common Mill Picks and Wood wedges Steel or Iron, &c. Solid eye Picks, with one lb. of best Cast Steel inserted in each pick. The above goods are warranted inferior to none, both in quality and style of finish. All hammers have true eyes and polished faces, and are made from solid cast steel. No charge is made for boxing or carting at Augusta; shipping facilities are excellent. Hammers made to any pattern or drawing. Capacity of works, one ton of hammers per day. A full line of the above goods constantly in stock. Catalogue on application.

BLAKE'S PATENT STONE & ORE BREAKER.

New Pattern with Important Improvements & Abundant Strength



For reducing to fragments all kinds of hard and brittle substances, such as STONE for making the most perfect MACADAM ROADS, and for making the best CONCRETE. It breaks stone at trifling cost for BALLASTING RAILROADS. It is extensively in use in MINING operations, for crushing

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Also for crushing Quartz, Flint, Emery, Corundum, Feldspar, Coal, Barites, Manganeses, Phosphatic Rock, Plaster, Soapstone, &c. For Illustrations, Circulars, and particulars, address,

BLAKE CRUSHER CO., New Haven, Conn.

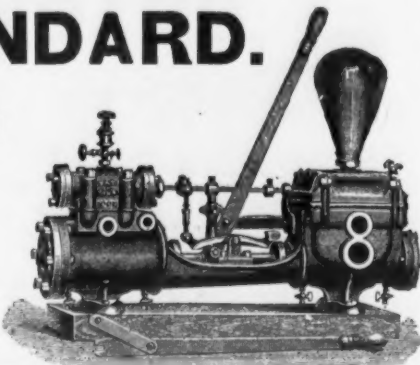
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Knowles Steam Pump

Works,

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The C. O. D. Engine

COSTS LESS

And is equal to any Engine in the market.
ALL WORKING PARTS WELL FINISHED.

No. 1, Cylinder 1 1/2 in. \$125.00
No. 2, " 1 1/4 in. 150.00

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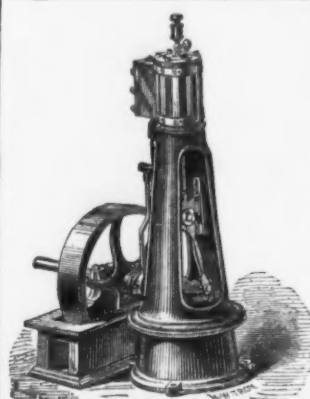
115 Liberty St., New York.

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SCRIPTURE'S FUNNEL TOP OILERS.



Keystone Pressure Blowers.

Maximum Blast and Minimum Power.

All sizes for

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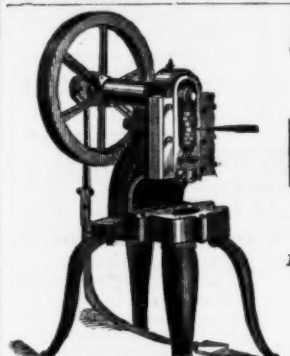
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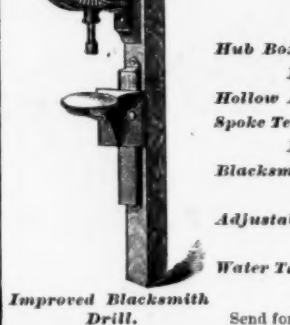
West Meriden, Conn.

Machinery Hall, Philadelphia, Section B 4, Columns 28 and 29.

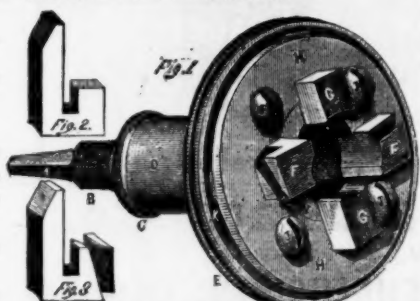
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Malleable Iron Castings

Of superior Quality and Hardware Specialties in Malleable Iron made to order.

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The Best

SMALL

POWER ENGINES IN THE COUNTRY.

Manufactured by

WARD B. SNYDER.

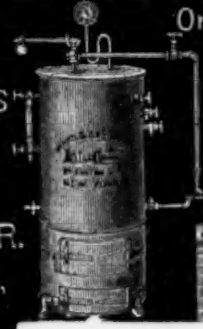
94 Fulton St.,

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One-Horse Power, with tubular boiler complete, only... \$150.

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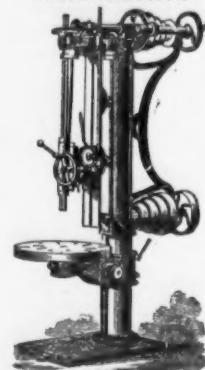
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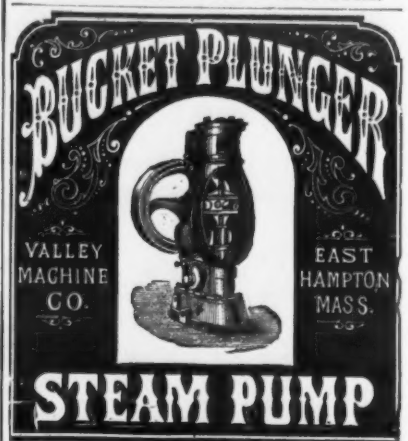
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superior to any other Light for Mining

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THE Shapley Engine

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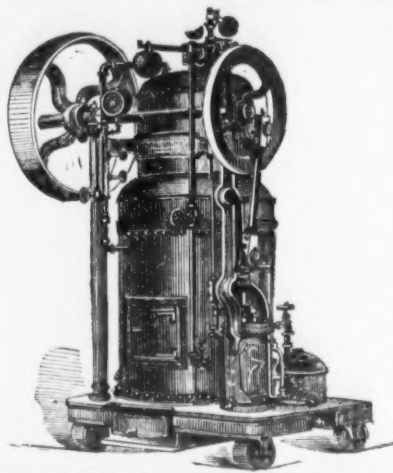
COMPACT,
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Rolls Turned for Rails, Beams, Angles, and all shapes for Iron, Steel, or Composition Metals.

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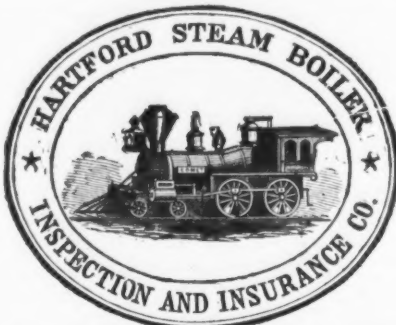
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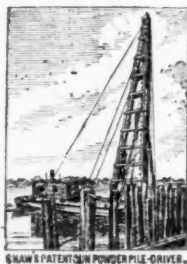
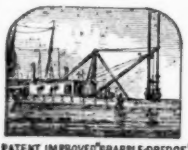
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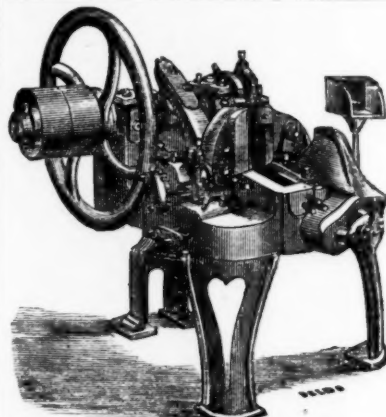
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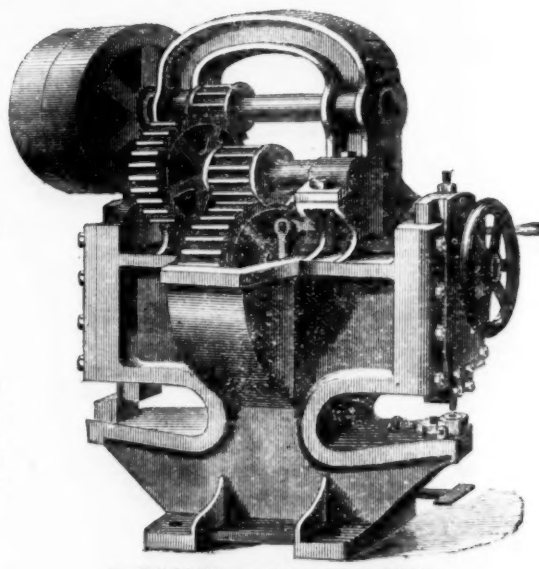
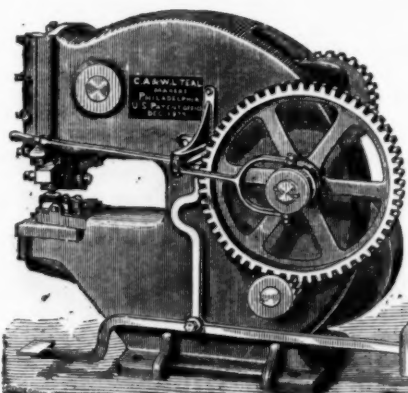
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